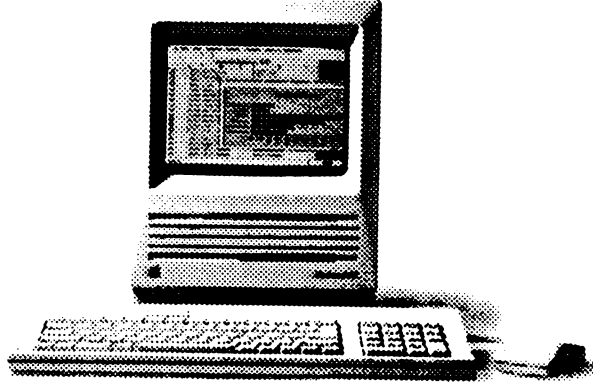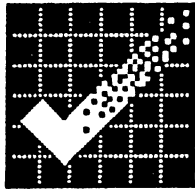# Macintosh Service Course
Prerequisite Manual – Vol. 2

Participant's Manual

APPENDIX I:
LIST OF COMMAND
KEYS & SHORTCUTS

If you prefer using keyboard commands, rather than the mouse and pull down menus, you will find these command key options for the Macintosh Finder listed below:

File

New Folder	To create a new folder	New Folder ⌘N
Open	To open a selected icon	Open ⌘O
Print	To print a selected document	Print ⌘P
Close Window	To close the active window	Close Window ⌘W
Get Info	To obtain information about a selected icon	Get Info ⌘I
		Sharing...
Duplicate	To duplicate a selected icon	Duplicate ⌘D
		Make Alias
Put Away	To return a selected icon to its original position or folder	Put Away ⌘Y
Find...	To open the search dialog box	Find... ⌘F
Find Again	To repeat a search	Find Again ⌘G
		Page Setup...
		Print Desktop...

Edit

Undo	To undo the last action or edit	Undo ⌘Z
Cut	To cut a selection to the clipboard	Cut ⌘X
Copy	To copy a selection to the clipboard	Copy ⌘C
Paste	To paste from the clipboard	Paste ⌘V
		Clear
Select All	To select everything	Select All ⌘A
		Show Clipboard

```
┌─────────────────────────────┐
│ Special                     │
├─────────────────────────────┤
│ Clean Up Desktop            │
│ Empty Wastebasket...        │
├·····························┤
│ Eject Disk            ⌘E   │
│ Erase Disk...               │
├·····························┤
│ Restart                     │
│ Shut Down                   │
└─────────────────────────────┘
```

Eject disk   To eject a floppy disk from the disk drive

Apart from using the above command keys, you can also use the following keyboard shortcuts as you work with the icons and windows on your desktop:

Working with icons	To open an icon	Double-click the icon or press Command-Down Arrow
	To copy an icon into another folder (instead of moving it)	Option + drag the icon
	To clean up selected icons	Shift + Clean Up
	To clean up and sort icons	Option + Clean Up

Selecting icons	To select an icon by name	Begin typing the name
	To select the next icon alphabetically	Tab
	To select the previous icon alphabetically	Shift-Tab
	To select an icon to the left or right (in icon views only)	Left Arrow or Right Arrow
	To select an icon above or below (in any view)	Up Arrow or Down Arrow
	To select more than one icon	Shift + click the icons, or drag to enclose them
	To make the desktop active	Command-Shift-Up Arrow
Working with windows	To close all windows	Option + Close, or Option + click the close box
	To move a window without making it active	Command + drag the window
	To display a pop-up menu of the enclosing folders and disk	Command + press the window title
	To open the window that encloses the active window	Command-Up Arrow
	To close a dinwow after opening one of its icons	Option + Open, or Option + double-click the icon
	To zoom a window to the full size of the screen it's on	Option + click the zoom box

Working with outline views	To change the view	Click a view title in the window header
	To expand the outline of the selected folder	Command-Right Arrow
	To collapse the outline of the selected folder	Command-Left Arrow
	To expand the entire outline of the selected folder	Command-Option-Right Arrow
	To collapse the entire outline of the selected folder	Command-Option-Left Arrow
Miscellaneous options	To take a snapshot of the screen	Command-Shift-3
	To avoid seeing a warning message and to remove locked files	Option + Empty Wastebasket
	To reverse the current setting of "Always snap to grid" while moving an icon	Command + drag the icon
	To rebuild the Desktop file	Hold down Command-Option while your Macintosh starts up
	To turn off all system extensions when starting up	Hold down Shift while your Macintosh starts up

Apple Hard Disk Capabilities

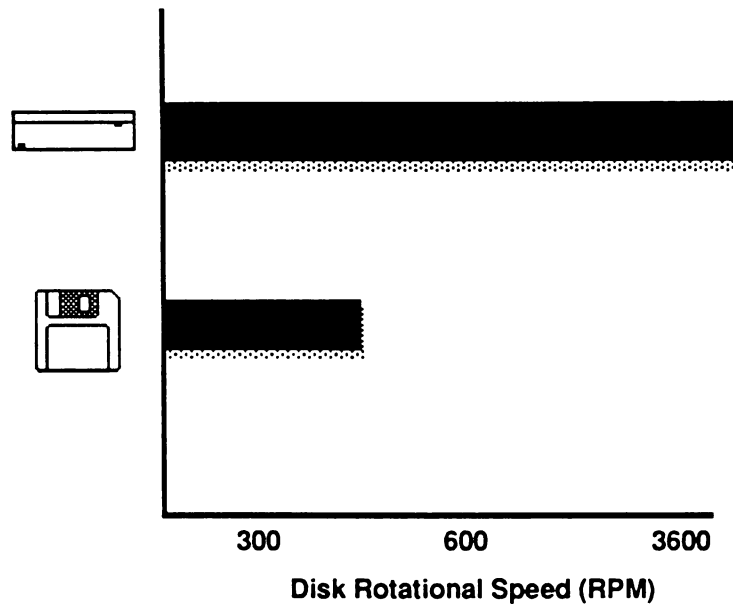300   600   3600

Disk Rotational Speed (RPM)

Figure 5. Comparison of disk rotation speed of a floppy disk drive and a hard disk.

Hard Disks as Storage Devices

Users can store all of their applications, documents, and important files on the hard disk. Users can then launch applications directly from the hard disk. This is more convenient for users because they do not have to insert and keep track of multiple application diskettes.

Hard Disks as Startup Devices

Most users configure one hard disk as a startup device. This means that the hard disk contains the system software that the computer requires to start up. The main advantage to configuring a hard disk as a startup device is that starting up from a SCSI device is faster than booting from a diskette. Also, since the users can store all their application programs on the hard disk, they can boot the computer, launch their application programs, and store their documents without using any diskettes.

Macintosh Service Course
Prerequisite Manual – Vol. 2

Understanding SCSI

Apple Hard Disk SC

ImageWriter II

Apple Service Reference Materials

Apple Service Administration

Module Introduction

Overview

SCSI (pronounced skuh'-zee) stands for Small Computer System Interface. SCSI is a parallel interface that many manufacturers use to provide a standard means for connecting computers and peripheral devices such as hard disk drives, printers, and scanners.

SCSI offers users several advantages:

- Speed: SCSI transfers information between the computer and SCSI peripheral devices much faster than other interfaces.

- Flexibility: SCSI is a standard interface, so you can use existing system software to communicate with SCSI devices from different manufacturers.

- Expandability: You can connect as many as seven peripheral devices to a Macintosh computer.

Setting up a network using the SCSI Cable System consists of three general tasks:

- connecting the appropriate cables to the computer and the other SCSI devices
- properly terminating the network
- ensuring that each device has a unique identification (priority) number

This module provides the information you need to connect SCSI devices to Macintosh computers. In the next module "Apple Hard Disk SC," you will apply this knowledge as you connect an Apple external SCSI hard disk to a Macintosh.

What You Will Learn

In this module, you will learn how to:

- assign priority numbers to devices
- use the right type of cable for each connection
- terminate a SCSI system

The Skills Checklist following this Module Introduction lists, in detail, the tasks you should be able to perform upon completion of this module.

Module Introduction

How You Will Be Tested

You will demonstrate your knowledge about SCSI in two tests:

The Module Test - is a written test that will help you verify that you have achieved the skills listed in the Skills Checklist.

The Prerequisite Exam - consisting of written and hands-on items, this test will verify that you can perform the tasks listed on the Skills Checklist and that you are ready for the Lab part of this course.

During the Lab part of this course, you will be expected to connect SCSI devices to Macintosh computers during hands-on exercises.

Prerequisites to this Module

Before beginning this module, you must have satisfactorily completed these modules:

- Welcome to Apple Service
- Macintosh Basic Features
- Setting Up Macintosh Computers
- Using Macintosh Computers

Materials Provided for this Module

The Prerequisite provides the following items for this module:

- This Module Workbook
- Module Test

Materials You Need to Provide

You do not need any additional materials to complete this module. If you have SCSI cables and terminators available, you may want to examine them as you read about them in this module.

Module Introduction

How the Module Is Organized

This module is organized in two parts:

Part 1 - SCSI Priority Numbers – This part explains what SCSI priority numbers are, why they are important, and how to set them.

Part 2 - SCSI Cables and Terminators – This part describes the three SCSI cables, explains when to use them and explains how to properly position SCSI terminators.

Following these two parts is the Module Summary.

Continue with the Skills Checklist on the following pages.

Skills Checklist

What Is the Skills Checklist?

This is a list of tasks that you should be able to perform at the conclusion of this module. The Prerequisite Exam (written and hands-on) will cover these items. During the Lab part of this course, you will be expected to be able to perform all of these tasks.

How to Use the Checklist

Before starting this module, check the tasks on this list to see which you can already perform. If you are confident that you can already perform certain tasks, you may decide to skip those parts of the module. Or you may decide to try the Module Test without going through the module.

After completing the module, you should check this list to make certain that you have mastered all the skills before you attend the Prerequisite Exam and the Lab part of this course. If you feel uncertain about any of these tasks, return to the section indicated, review the information and repeat the hands-on exercises

Skills Checklist

	Task	Section Where the Task Is Covered
____	1. Identify the maximum number of SCSI devices that you can connect to Macintosh computers.	Setting Priorities Among SCSI Devices
____	2. Explain why each SCSI device on a network must have a unique SCSI ID number.	Setting Priorities Among SCSI Devices
____	3. For a configuration involving a Macintosh and a variety of SCSI devices, assign SCSI priority numbers.	Setting Priorities Among SCSI Devices
____	4. Identify the three types of SCSI cables.	SCSI Cables and Terminators
____	5. Indicate which type of SCSI cable should be used for a given configuration.	SCSI Cables and Terminators
____	6. Determine if a SCSI network is properly terminated.	SCSI Cables and Terminators
____	7. Identify the devices on a SCSI network that must be powered on for the network to function properly.	SCSI Cables and Terminators
____	8. Indicate how many terminators are required and where they should be positioned for a given configuration.	SCSI Cables and Terminators

Continue with the next section - Setting Priorities Among SCSI Devices.

Setting Priorities Among SCSI Devices

Introduction

This section explains what SCSI priority numbers are, why they are important, and how to set them. The section begins by explaining a few key terms.

SCSI Terms

A **SCSI bus** is a physical path on which electronic data travels.

A **SCSI device** is any computer or peripheral device that can communicate on a SCSI bus. A SCSI peripheral device may be built into a computer (an internal SCSI device) or externally attached to the computer with the SCSI Cable System (an external SCSI device).

A **SCSI chain or network** is a group of SCSI devices connected by SCSI cables. For example, a Macintosh Plus connected to a SCSI hard disk and a CD-ROM drive form a SCSI chain, as shown in Figure 1. A SCSI network can have up to seven devices in addition to the computer.
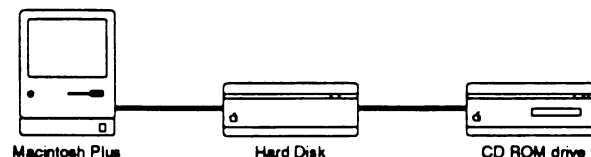
Macintosh Plus   Hard Disk   CD ROM drive

Figure 1. Example of a SCSI chain

SCSI ID Numbers

Each device on a SCSI bus has a **SCSI identification number** ("ID number" or "priority number"). The computer uses the ID numbers to identify and distinguish between the devices. The SCSI ID number identifies each device regardless of its physical location in the SCSI chain.

The ID number also determines which device communicates first when more than one device wants to use the bus. Eight numbers (0-7) are used to establish identity and priority on the SCSI bus. The higher the number, the higher the priority given for using the SCSI bus. Generally, the computer is assigned priority 7, making it the highest priority device.

Setting Priorities Among SCSI Devices

Factory-Set Numbers

At the factory, similar products are assigned the same SCSI ID number. For example, all Apple SCSI external hard disks are assigned the ID number 5. Here is a list of currently offered Apple SCSI products and their factory-set ID numbers.

- all Macintosh computers   7
- Apple external SCSI hard disks   5
- LaserWriter II SC   4
- Apple CD SC   3
- Apple Scanner   2
- Apple Tape Backup 40SC   1
- Apple internal SCSI hard disks   0

SCSI ID Numbers Must Be Unique

Regardless of their factory-set ID numbers, each device on a SCSI network must have a unique ID number. If two devices have the same ID number, they may send data at the same time, which could damage files. Devices with the same priority number can also cause a failure to boot. So remember—**make certain that all SCSI devices on a bus have a unique ID number.**

This means that before you connect SCSI devices, you must check their ID numbers to ensure that no two devices have the same number. If you are connecting more than one of the same type of Apple device, you will most likely need to change one of their ID numbers. For example, Apple external SCSI hard disks come from the factory with the ID number 5. If you plan to connect two or more of the hard disks on one SCSI bus, you will have to change the numbers so that each hard disk has a unique number.

Do not assume that the devices still have their factory settings. **Make it a rule to check all ID settings before connecting SCSI devices!**

Setting ID Numbers

You can set the ID or priority numbers of most SCSI peripheral devices by using a physical mechanism. For some devices, like Apple SCSI hard disks, you set the number on a thumbwheel or a switch, as shown in Figure 2. For other devices, like the Apple LaserWriter SC, you change the ID number by setting DIP switches. For some third-party products, you use a software application to set the priority. For exact instructions, consult the Owner's Manual for each device involved.
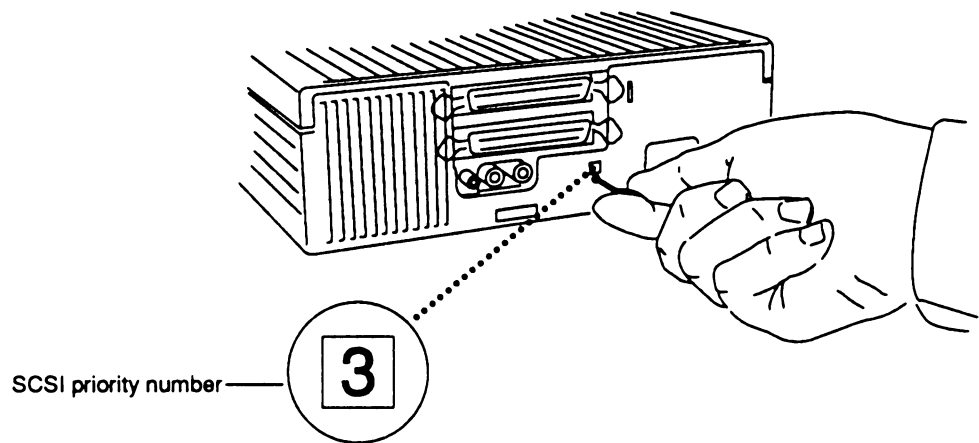
Setting Priorities Among SCSI Devices

Figure 2. Using a paper clip to change the priority number of an Apple SCSI hard disk

Determining Priorities

In general, you should assign the higher priorities to startup devices. For example, a hard disk that is configured as the startup disk should rank just after the computer. The computer is usually 7, so the hard disk would be priority 6 or 5. Remember that when the system scans through the SCSI devices for a startup disk, the system searches from the highest priority number to the lowest.

You can assign the lower priorities to the least-used equipment. For example, a tape backup drive, which you use less often than a startup disk, is factory-set at 1. Use the factory settings as a guideline for setting priority numbers

SCSI with Macintosh Computers

The Macintosh is assigned top priority, ID 7. You cannot change this ID number. You can connect a maximum of 7 other SCSI devices to a Macintosh computer. You assign ID numbers to the other SCSI devices according to whether they are startup devices and how often they are used.

Macintosh internal SCSI hard disks are factory set to ID 0. You should only change the ID number on an internal hard disk when you need to reconfigure the hard disk for use as an external hard disk. (You will learn to do that later in this course.)

If you have more than one hard disk connected to a Macintosh and want the internal hard disk to be the startup disk, you can use the Control Panel desk accessory to designate the internal hard disk as the preferred startup disk.

Setting Priorities Among SCSI Devices

Startup Disk Search Order

Generally, if you want to start up (boot) your system from an external SCSI hard disk, you should assign it ID 6. When a Macintosh computer (ID 7) starts up, it looks for the required startup information by scanning devices in the following order:

1. The lower internal floppy disk drive (on Macintosh II computers, the drive on the right side)
2. The upper internal floppy disk drive, if one is installed (on Macintosh II computers, the drive on the left)
3. Any external non-SCSI drives (either 3.5-inch floppy drives or external hard disks)
4. Any startup device selected via the Control Panel's Startup Device CDEV
5. **SCSI devices—beginning with ID 6 and ending with ID 0**

Example

Here is an example of the priority numbers assigned in a system:

Macintosh SE	ID 7
Apple external SCSI hard disk	ID 5
Apple LaserWriter SC	ID 4
AppleCD SC	ID 3
Apple Scanner	ID 2
Apple Tape Backup 40SC	ID 1
Apple internal SCSI hard disk	ID 0

If a startup diskette is placed in a floppy disk drive on this Macintosh SE system, it would boot from the diskette.

If no diskette is inserted in the floppy disk drive, the system would boot from the external SCSI hard disk. If the internal hard disk is the designated startup disk in the Control Panel, the system would boot from the internal hard disk.

Continue with the next section - Exercise: SCSI Setting Priorities Among SCSI Devices.

Exercise: Setting Priorities Among SCSI Devices

Directions

For items 1 and 2, write the information requested.

1. What is the maximum number of peripheral devices you can attach with the SCSI cable system to a Macintosh computer?

   _____ devices

2. What are the ID numbers for the following?

   a) Macintosh computers _____

   b) Apple internal SCSI hard disks _____

Directions

For items 3 through 6, indicate whether the statements are correct or incorrect by checking TRUE or FALSE.

3. All devices of the same type (for example, all printers) should have the same priority number when connected to a SCSI network.

   ___ TRUE   ___ FALSE

4. If you want an internal SCSI hard disk to be the startup disk, you should give it a higher SCSI ID, such as 5 or 6.

   ___ TRUE   ___ FALSE

5. On most Macintosh computers, you can designate a preferred startup disk by selecting the disk with the Control Panel's Startup Device CDEV.

   ___ TRUE   ___ FALSE

6. If you add an external SCSI hard disk to a Macintosh, you should change the SCSI ID number of the Macintosh to 5 or 6.

   ___ TRUE   ___ FALSE

Exercise: Setting Priorities Among SCSI Devices

Directions

Item 7 has two parts. Answer as indicated.

7. Assume that you are setting up a SCSI network that includes a Macintosh II that has one internal SuperDrive floppy disk drive and an internal 40MB SCSI hard disk. You want to add two Apple external SCSI hard disks, an Apple Tape Backup 40SC, an Apple LaserWriter SC, and an Apple Scanner. All of these devices still have their factory-set SCSI ID numbers.

   a. Would you have to change any ID numbers for this SCSI system? If so, for which device(s)? Why? What number(s) would you assign them?

   _____

   _____

   b. What should you do to make the system boot from the internal SCSI hard disk?

   _____

   _____

Compare your answers to those provided on the next page.

Exercise: Setting Priorities Among SCSI Devices (Answers)

1. 7

2. a) Macintosh computers - 7
   b) Apple internal SCSI hard disks - 0

3. FALSE - All devices on a SCSI network must have a unique number.

4. FALSE - You should not change the ID number on an Apple internal SCSI hard disk.

5. TRUE

6. FALSE - You cannot change the ID number on a Macintosh computer. Change the number of one of the hard disks.

7. a. Yes, you would have to change the ID of one of the external hard disks, because they would both have an ID number of 5. You would change one of them to 6.

   b. Use the Control Panel to designate the internal hard disk as the startup device.

If you missed any of these items, review the section entitled "Setting Priorities Among SCSI Devices."

If you completed the items correctly....

Continue with the next section - SCSI Cables and Terminators.

SCSI Cables and Terminators

Overview

Setting up a SCSI network requires that you know how to use the various SCSI cables and know how to terminate the system. Improper cabling and termination can result in system malfunctions or damage.

In this section, you will learn:

- how to identify the three SCSI cables
- when to use each cable
- how to terminate a SCSI network

SCSI Cables

There are three types of SCSI cables. As you read the following descriptions, look at Figure 3 for illustrations of the three cables.

System Cable

Peripheral Interface Cable

Clips

Cable Extender
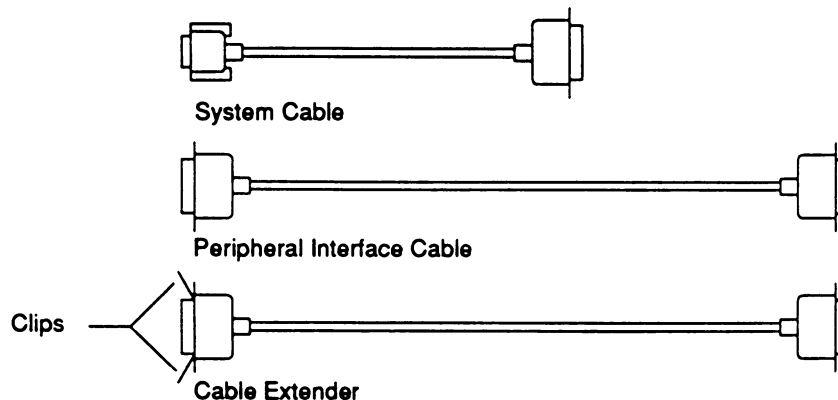
Figure 3. Three types of SCSI cable

System Cable

The System Cable is 18 inches long and is the shortest of the three SCSI cables. One end of the cable has a DB-25 connector, which plugs into the SCSI port on the computer. The other end of the System Cable has a 50-pin connector, which plugs into a peripheral device, a Cable Extender or a Cable Terminator. (You will learn about Cable Extenders and Cable Terminators later in this section). Figure 4 shows an example of the how the System Cable is used. In all configurations, only one System Cable is used.

SCSI Cables and Terminators
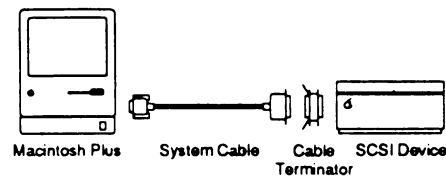
Figure 4. Example of a System Cable connecting a computer to an external SCSI device

Peripheral Interface Cable

The Peripheral Interface Cable is approximately 3 feet long and has *identical* 50-pin connectors on each end. The inside of each connector is recessed and lined with gold ribbon pins. If you have more than one SCSI peripheral device, you use this cable to connect the peripheral devices to each other. You can not use a Peripheral Interface Cable to connect a Macintosh to a peripheral device. Figure 5 shows one Peripheral Interface Cable attached to one additional device. Figure 6 shows multiple Peripheral Interface Cables attached to more devices.
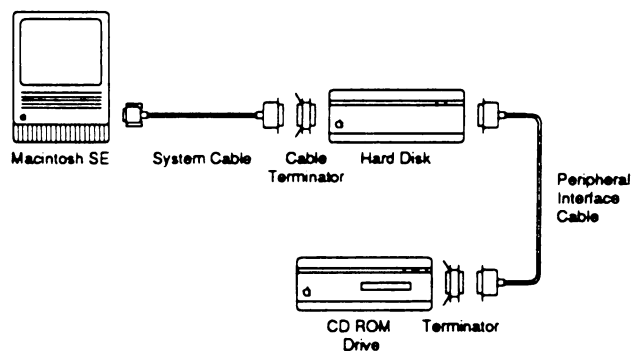
Figure 5. Example of one Peripheral Interface Cable connecting an additional external SCSI device

SCSI Cables and Terminators
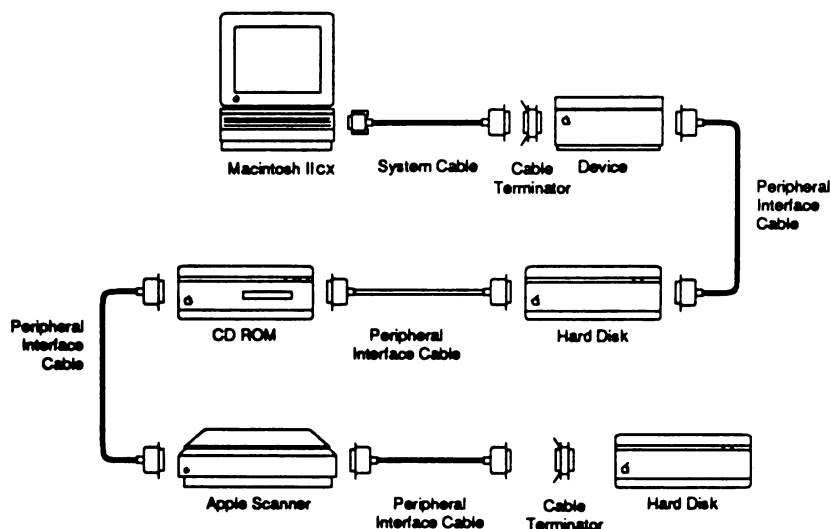
Figure 6. Example of multiple Peripheral Interface Cables connecting additional external devices

Cable Extender

The Cable Extender is the same length as the Peripheral Interface Cable (3 feet), but has *different* 50-pin connectors at each end. One 50-pin connector is recessed and has binding clips that you attach to a Peripheral Interface Cable, a System Cable 50-pin connector or to another Cable Extender. The other 50-pin connector has protruding pins. You attach this connector to a Cable Terminator or to the next SCSI device.

You use the Cable Extender like an extension cord. You can add Cable Extenders at any point in the chain if the devices are too far apart for the System Cable or Peripheral Cable to connect them. You can connect several Cable Extenders together, if you need to, as long as the total cable length is not more than 20 feet (6.5 meters). The maximum length for a SCSI bus is 20 feet. See Figure 7 and 8 for examples of how the Cable Extender can be used. As shown in the figures, Cable Extenders always have clips on one connector end.

SCSI Cables and Terminators
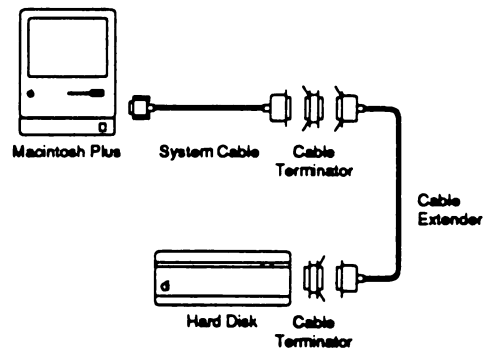
Figure 7. Example of the use of one Cable Extender
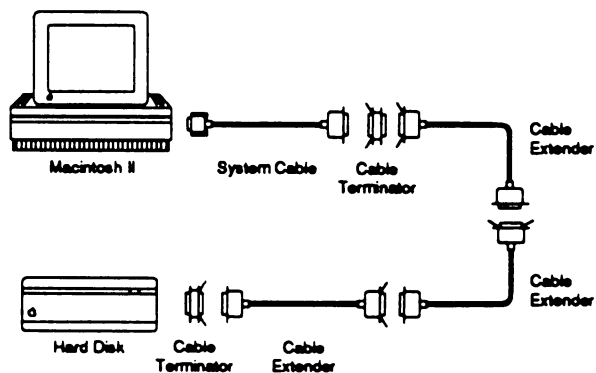
Figure 8. Example of the use of multiple Cable Extenders

SCSI Cables and Terminators

SCSI Termination

Electrically terminated resistors are required to ensure signal integrity along a SCSI bus. These resistors control voltage range and keep signals from bouncing off one end of the bus and rippling back, interfering with new messages. Figure 9 compares a properly terminated SCSI bus to an improperly terminated one.
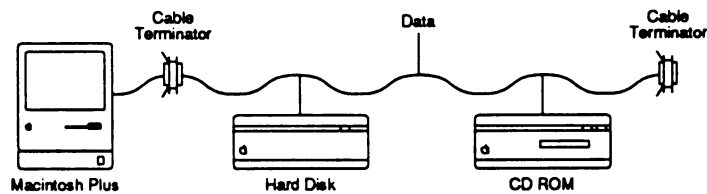
With proper termination
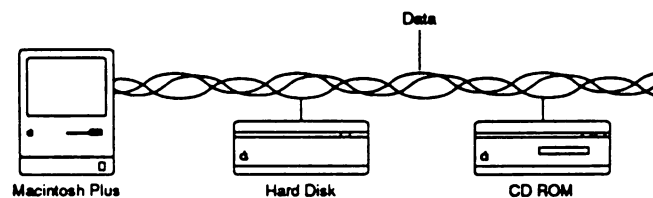
Without proper termination

Figure 9. Comparison of a SCSI bus with and without terminators

Any SCSI bus that is more than one cable long must be terminated at each end. If the bus is only one cable long (the System Cable), you need only one terminator. A SCSI bus should never have more than two terminators. A SCSI chain with more than two terminiators may cause intermittent problems or inhibit booting.

SCSI Cables and Terminators

**SCSI Cable
Terminator**

A Cable Terminator is a plastic case containing electrically terminated resistors, as shown in Figure 10. You attach Cable Terminators to either the SCSI port of a SCSI device or to one end of a SCSI cable.
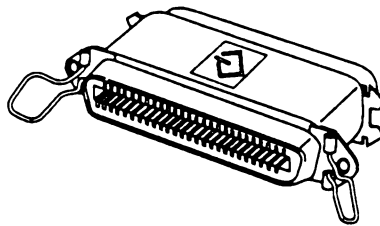
Figure 10. A SCSI Cable Terminator

Built-In Terminators

Some SCSI devices have built-in terminators—electrically terminated resistor packs that are plugged into sockets on the circuit board of a device. Figure 11 shows a SCSI device with built-in terminators.

Terminating
Resistors
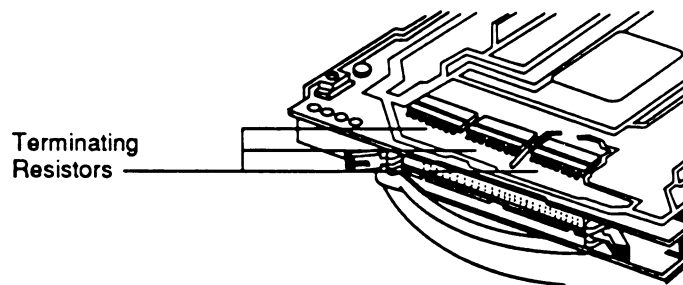
Figure 11. Terminating resistors built into an Apple internal SCSI hard disk

All Apple internal SCSI hard disks have built-in terminating resistors. Apple SCSI external devices do not have built-in terminators.

SCSI Cables and Terminators

Proper Termination is Critical!

You must properly terminate a SCSI chain. Improper termination can result in a variety of problems. Uncontrolled voltage can damage SCSI circuits inside the computer. Electrical noise in the system can corrupt files. An improperly terminated system may fail to boot or suffer intermittent failures.

Guidelines for Positioning SCSI Terminators

The number and positioning of terminators depends on how many devices you are connecting, the distance between devices and if the devices have internal terminators. Study the following guidelines and examples for placing Cable Terminators.

- Make sure the first peripheral device and the last peripheral device in your SCSI chain are terminated (either internally or externally).

- Some non-Apple SCSI devices have built-in terminators. If you have only one such device, place it at the end of your SCSI chain and do not add a Cable Terminator.

- If you have more than one non-Apple device that has internal terminating resistors, make certain that you have only two terminators in the SCSI chain. You must remove the extra terminators.

Note: *For more details on third-party SCSI devices, consult the documentation that came with the device.*

- If the computer contains an internal hard disk, the hard disk contains terminating resistors. Attach one Cable Terminator to the last SCSI device's open SCSI port on your SCSI bus (unless that device has internal terminating resistors.)

- If you attach only one external SCSI device to a computer with the Apple SCSI System Cable, attach one Cable Terminator. Because the System Cable is only 18 inches long, one terminator is sufficient to control the voltage range and protect the signals from reflecting back on the cable.

- A cable system longer than 18 inches requires two terminators. If you connect one device to a computer without an internal hard disk by using a System Cable and a Cable Extender, place a terminator between the System Cable and the Cable Extender as well as attaching a Cable Terminator to the end of the Cable Extender.

SCSI Cables and Terminators

Figures 12 and 13 show how to organize SCSI buses. Notice the placement of terminators, with one at the beginning of the SCSI chain and one at the end of the chain.

Third-party SCSI devices with internal terminators
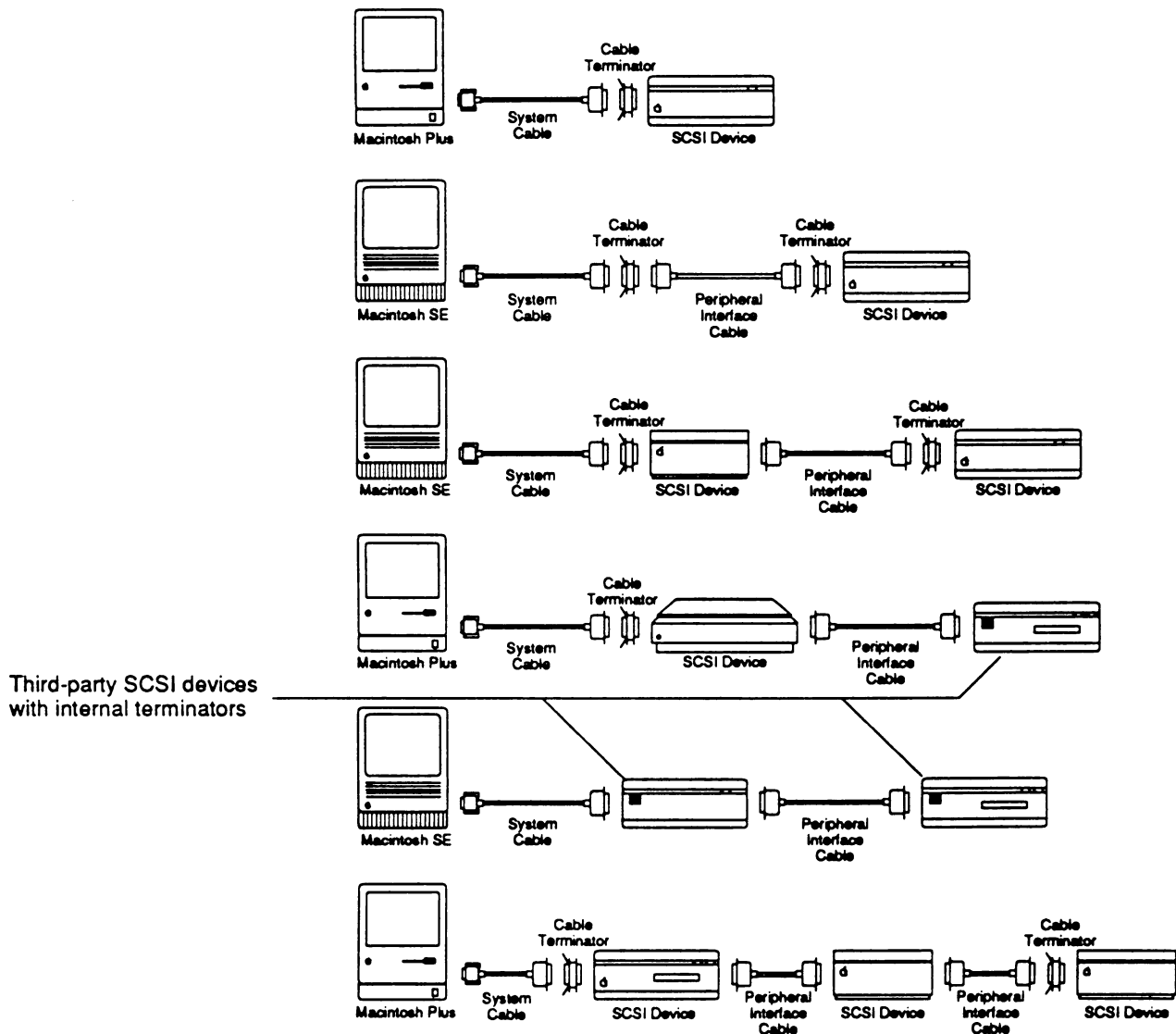
Figure 12. Macintosh computers without an internal SCSI hard disk and with external SCSI devices

SCSI Cables and Terminators

Internal hard disks with built-in terminators

Third-party SCSI device with internal terminator
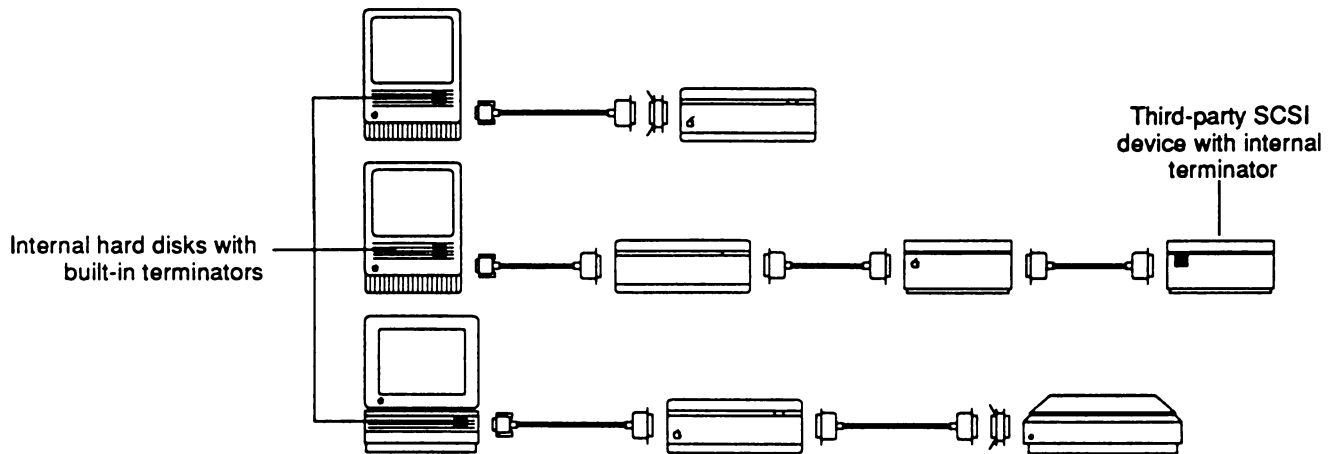
Figure 13. Macintosh computers with an internal SCSI hard disk and external SCSI devices

Summary of SCSI Equipment Needed

Depending on the number and type of devices in your SCSI chain and your space requirements, you will choose a combination of SCSI cables and cable terminators. Tables 1 and 2 show the equipment you need for various combinations of devices.

SCSI Cables and Terminators

Number of peripheral devices and distance from computer or other device	System Cable	Peripheral Interface Cable	Cable Extender	Cable Terminator
1 device *within 18 inches of computer*	Yes	No	No	1
1 device *more than 18 inches from computer*	Yes	No	Yes*	2
2 or more devices *less than 3 feet apart*	Yes	Yes*	No	2
2 or more devices *3 feet or more apart*	Yes	Yes*	Yes*†	2

* You need this type of cable, but the *number* of cables you need depends on the distance between devices and on how many devices you are connecting.

† Remember that you cannot use more than 20 feet of cable.

Table 1. SCSI cable formula for a Macintosh without an internal hard disk

SCSI Cables and Terminators

Number of peripheral devices and distance from computer or other device	System Cable	Peripheral Interface Cable	Cable Extender	Cable Terminator
1 device *within 18 inches of computer*	Yes	No	No	1
1 device *more than 18 inches from computer*	Yes	No	Yes*	1
2 or more devices *less than 3 feet apart*	Yes	Yes*	No	1
2 or more devices *3 feet or more apart*	Yes	Yes*	Yes*†	1

* You need this type of cable, but the *number* of cables you need depends on the distance between devices and on how many devices you are connecting.

† Remember that you cannot use more than 20 feet of cable.

Table 2. SCSI cable formula for a Macintosh with an internal hard disk

SCSI Cables and Terminators

First and Last

When you want to use any of the peripheral devices on a SCSI network, the devices that have terminators attached (the first and last device) must be turned on in order to pass information through the cable system. If you are not using any devices in the middle of the chain, you can leave them switched off.

Examples

Consider, for example, the network shown in Figure 14.
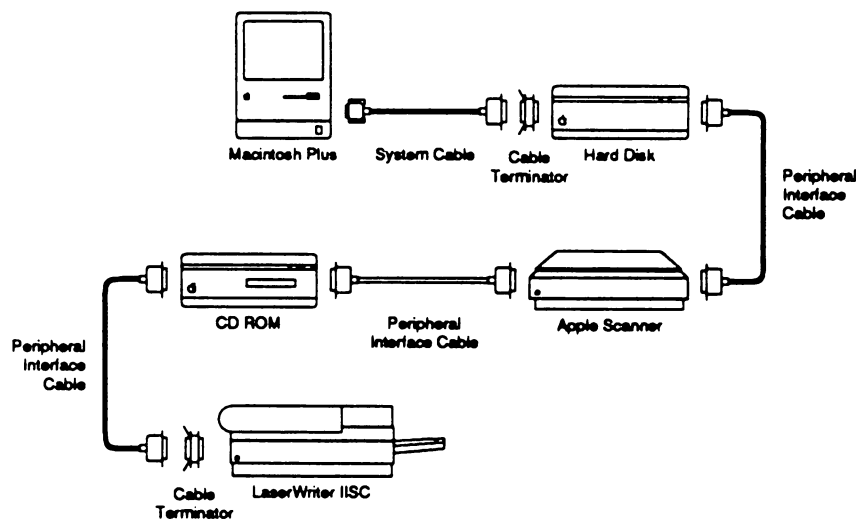
Figure 14. Example of a SCSI network

If the user of this network wants to use only the computer and the external hard disk, he needs to also power on the printer because it has the second terminator. He does not have to turn on the scanner or the CD ROM drive because they do not have terminators.

Continue with the next section - Exercise: SCSI Cables and Terminators.

Exercise: SCSI Cables and Terminators

Part 1

Directions

Three types of SCSI cables are shown below. For each item, indicate which cable should be used by writing the letter corresponding to the appropriate cable in the blank provided. Where more than one cable is needed, write the letters corresponding to all the cables needed. (For this part, don't worry about where you would place the terminators.)

A

B

C
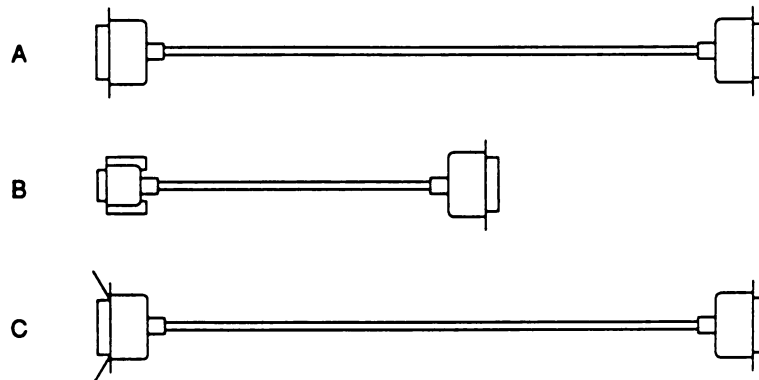
Items

____ 1. Connect a Macintosh computer to a peripheral device that will be positioned within 18 inches.

____ 2. Connect a Macintosh to a device that will be positioned two feet away.

____ 3. Connect a peripheral device to another peripheral device within two feet.

____ 4. Connect a peripheral device to another peripheral device within three feet.

____ 5. Connect a peripheral device to another peripheral device that is five feet away.

Compare your answers to those provided on the next page.

Exercise: SCSI Cables
and Terminators (Answers)

Part 1

Compare your answers to the ones below.

1. B - System Cable
2. B and C - System Cable and Cable Extender
3. A - Peripheral Interface Cable
4. A - Peripheral Interface Cable
5. A and C - Peripheral Interface Cable and Cable Extender

Continue with Part 2 on the following page.

Exercise: SCSI Cables and Terminators

Part 2

Answer the following questions as directed.

1. What is the maximum length for a SCSI network?

   _____ feet

2. For a SCSI network to function properly, which devices on the network must be turned on? Circle the correct answer.

   A. All of the devices on the network.
   B. At least the devices that have terminators attached.
   C. Only the computer and the peripheral devices you plan to use.

3. Assume that you are connecting two third-party peripheral devices to a Macintosh that has a SCSI internal hard disk. The third-party devices have built-in terminators, so you obviously have too many terminators for the network. What should you do?

   _____

Exercise: SCSI Cables and Terminators

4. Is the following system properly configured? If not, how should it be changed?

Internal hard disk ————————
with built-in terminator

Macintosh SE
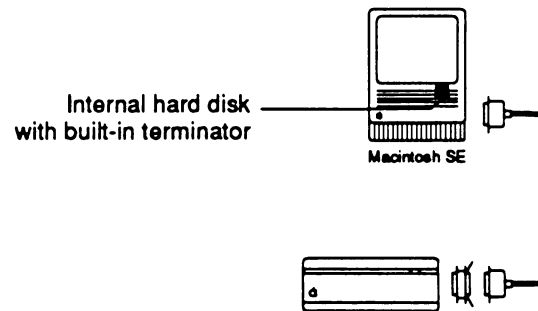
A. It's properly configured.
B. Remove the terminator.
C. Add a terminator between the computer and the cable.
D. Use a System Cable instead of a Peripheral Interface Cable.
E. Remove the terminator and use a System Cable instead of a Peripheral Interface Cable.

Exercise: SCSI Cables and Terminators

5. Is the following system properly configured? If not, how should it be changed?

Macintosh Plus
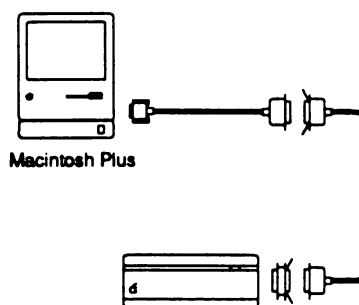
A. It's properly configured.
B. Add a terminator between the computer and the System Cable
C. Add a terminator between the System Cable and the Cable Extender.
D. Use a Peripheral Interface Cable instead of a Cable Extender.
E. Move the terminator to the other end of the Cable Extender.

Compare your answers to those on the next page.

Exercise: SCSI Cables
and Terminators (Answers)

Part 2

Compare your answers to the ones below.

1. 20 feet

2. B

3. Remove the extra terminator from one of the third-party devices.

4. D. Use a System Cable instead of a Peripheral Interface Cable.

5. C. Add a terminator between the System Cable and the Cable Extender.

Continue with Part 3 on the next page.

Exercise: SCSI Cables and Terminators

Part 3

Answer the following questions as directed.

1. Is the following system properly configured? If not, how should it be changed?

Macintosh II
without internal hard disk
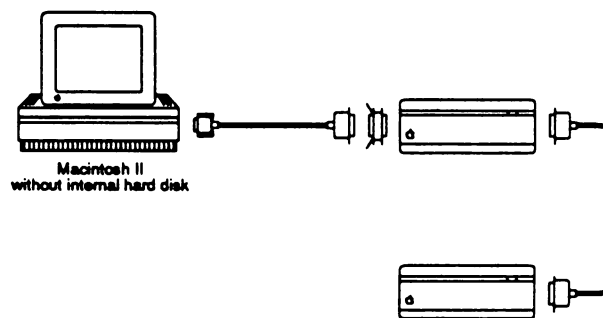
A. It's properly configured.
B. Remove the first terminator.
C. Move the terminator to between the Peripheral Interface Cable and the last device.
D. Place an additional teminator between the Peripheral Interface Cable and the last device.
E. Add a Cable Extender between the Peripheral Interface Cable and the last device.

Exercise: SCSI Cables and Terminators

2. Is the following system properly configured? If not, how should it be changed?
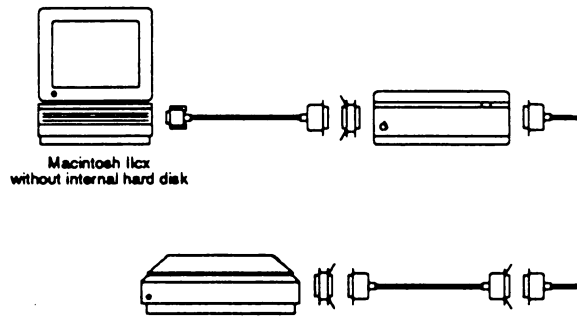
Macintosh IIcx
without internal hard disk

A. It's properly configured.
B. Remove the first terminator.
C. Add a terminator between the Peripheral Interface Cable and the last device.
D. Use another Peripheral Interface Cable instead of the Cable Extender.
E. Move the second terminator to between the Cable Extender and the Peripheral Interface Cable.

3. A customer wants to connect an external SCSI hard disk, an Apple LaserWriter SC, an Apple Scanner, and an AppleCD SC to a Macintosh SE which has an internal SCSI hard disk and plans to arrange them as shown in the figure below.

Internal hard disk with built-in terminator

Macintosh SE   Hard Disk   LaserWriter IISC

8 feet

Apple Scanner   AppleCD SC
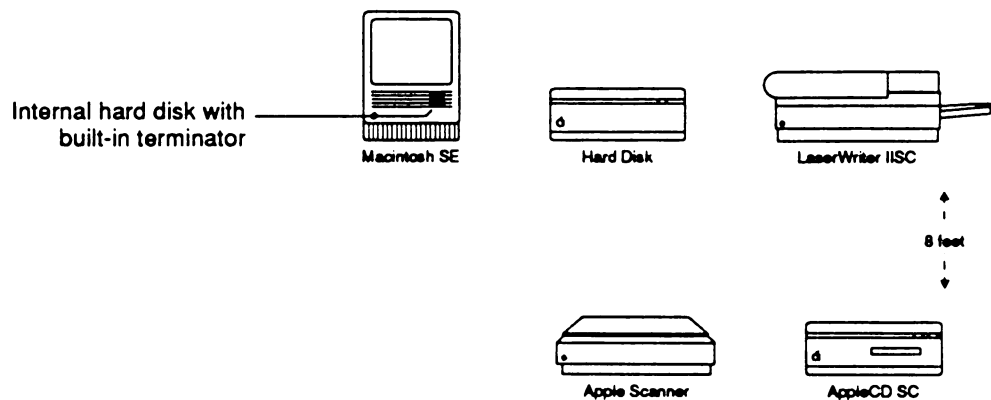
Exercise: SCSI Cables and Terminators

a. List the SCSI cables needed and state how many of each type.

_____

_____

_____

b. How many Cable Terminators are needed?

_____

c. Where should the Cable Terminator(s) be placed?

_____

_____

_____

Compare your answers to those provided on the next page.

Exercise: SCSI Cables
and Terminators (Answers)

Part 3

Compare your answers to the following.

1. D. Place an additional Cable Teminator between the Peripheral Interface Cable and the last device.

2. A. It's properly configured.

3. a. 1 System Cable
3 Peripheral Interface Cables
2 Cable Extenders

Internal hard disk with built-in terminator

Macintosh SE   System Cable   Hard Disk   Peripheral Interface Cable   LaserWriter IISC   Peripheral Interface Cable

Apple Scanner   Cable Terminator   Peripheral Interface Cable   AppleCD SC   Cable Extender   Cable Extender
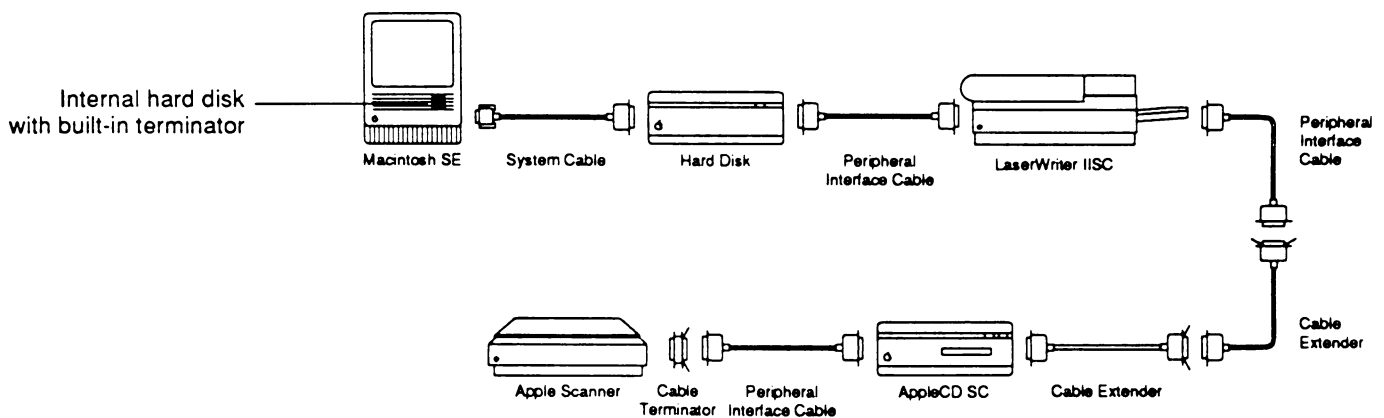
b. One Cable Terminator - the internal SCSI hard disk has a built-in terminator.

c. Place the Cable Terminator on the last SCSI cable in the network (Peripheral Interface Cable or Cable Extender).

If you missed any of the items in the three parts of this exercise, review the section entitled *SCSI Cables and Terminators.*

If you completed all the items correctly....

Continue with the next section - Module Summary.

Module Summary

SCSI, the Small Computer System Interface, is a parallel interface for connecting computers and peripheral devices, such as hard disk drives, printers and scanners.

Apple SCSI Devices

SCSI devices currently offered by Apple are:

- Macintosh computers
- SCSI hard disks 20, 40, 80, 160MB
- LaserWriter SC
- AppleCD SC
- Apple Scanner
- Apple Tape Backup 40SC

Macintosh computers can support up to seven other SCSI devices.

Priority Numbers

Each SCSI device on a network must have a unique priority or ID number. The computer uses these numbers to locate and distinguish between each device on the SCSI bus. SCSI ID numbers range from 0 to 7, with 7 indicating the highest priority.

SCSI devices have factory-set ID numbers, for example, all Apple LaserWriter SC printers are set at 4. You should always check the ID numbers on all SCSI devices before connecting them with SCSI cables to ensure that no two devices have the same ID number.

SCSI and Macintosh

A Macintosh computer has ID 7. A SCSI device that serves as the startup disk should be assigned the next highest number on the bus, either 6 or 5. Assign the other devices ID numbers by frequency of usage, with the least-used device assigned the lowest priority number.

Module Summary

SCSI Cables

You can extend a SCSI network up to 20 feet (6.5 meters) by using a combination of these three SCSI cables:

System Cable:

- 18 inches long
- connects the computer and first device
- DB-25 connector plugs into port on computer
- protruding 50-pin connector plugs into first device, Cable Extender or Cable Terminator

Peripheral Interface Cable:

- approximately 3 feet long
- connects one peripheral device to another
- protruding 50-pin connectors on both ends connect to SCSI peripheral device, Cable Extender or Terminator

Cable Extender:

- approximately 3 feet long
- provides means for extending connections between devices beyond the distance met by the System or Peripheral Interface Cables
- recessed, 50-pin connector connects to Peripheral Interface Cable, Cable Terminator or another Cable Extender
- protruding 50-pin connector connects to other peripheral device

Terminators

A terminator contains electrically terminated resistors that ensure signal integrity along the SCSI bus. A Cable Terminator is a plastic case containing terminating resistors. You attach Cable Terminators to SCSI devices or SCSI cables. Some SCSI devices have built-in terminating resistors; for example, all Apple internal SCSI hard disks have built-in terminating resistors.

The general rule is that a SCSI network must have two terminators, one between the computer and the first device and the second one just before the last device on the chain. Never set up a network that has more than two terminators.

Module Summary

The exception to the "two-terminator" rule is when you connect one Apple SCSI device to a computer, close enough for the System Cable to reach, you need only one terminator. The Cable Terminator goes on the end of the System Cable, between the cable and the device.

Refer to the section *SCSI Cables and Terminators* for guidelines and examples for positioning terminators.

A SCSI bus will not function properly unless the two devices that have terminators are powered on. Other devices without terminators do not have to be on unless you plan to use them.

You have now completed this module.

Check your skills and knowledge against the Skills Checklist. When you are ready take the Module Test.

Module Test

Directions

Answer the following questions as indicated. You may refer to the material in this module while doing this test.

1. What is the maximum number of SCSI devices that you can connect to Macintosh computers?

   _____ devices

2. What is the maximum length for a SCSI bus?

   _____ feet

3. Assume that you are setting up a SCSI bus that includes a Macintosh SE/30 with one internal SCSI hard disk, two external SCSI hard disks, an Apple Scanner, an Apple Tape Backup 40SC, and an Apple LaserWriter SC. All devices still have their factory-set SCSI ID numbers.

   a. Would you have to change any of the factory-set ID numbers? If so, why and for which device(s)? What number(s) would you assign to them?

   _____

   _____

   b. What should you do to designate the internal SCSI hard disk as the startup disk?

   _____

   _____

Module Test

4. Match cable names with each of the following SCSI cables. Write the letter corresponding to each cable by its name.

A

B

C
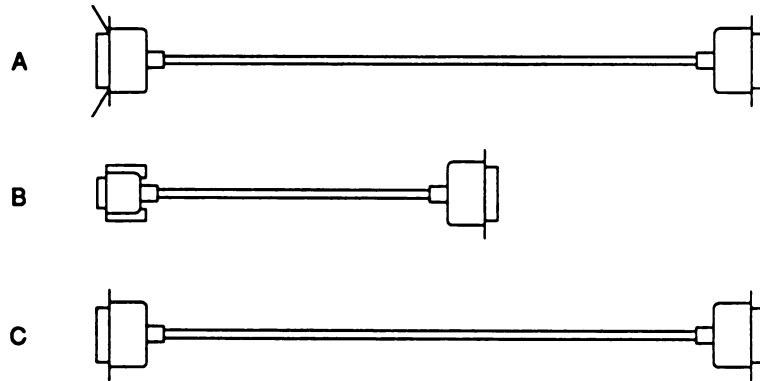
___ System Cable

___ Peripheral Cable

___ Cable Extender

Module Test

Directions

In each of the following items, determine if the network is properly configured. Are the right cables used? Are enough terminators included and are they positioned properly? What do you think should be changed? Check the options you think are correct.

5. Is this system properly configured? If not, how should it be changed?
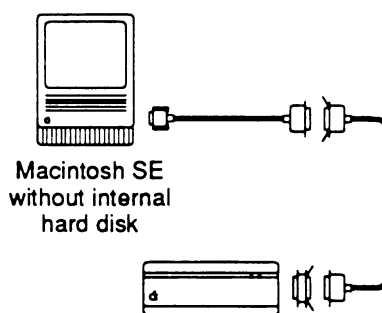
Macintosh SE
without internal
hard disk

A. It is properly configured.
B. Add a Cable Terminator between the Macintosh and the System Cable.
C. Add a Cable Terminator between the System Cable and the Cable Extender.
D. Add a Cable Terminator between the Cable Extender and the device.
E. Use a Peripheral Cable instead of the Cable Extender.

Module Test

6. Is this system properly configured? If not, how should it be changed?
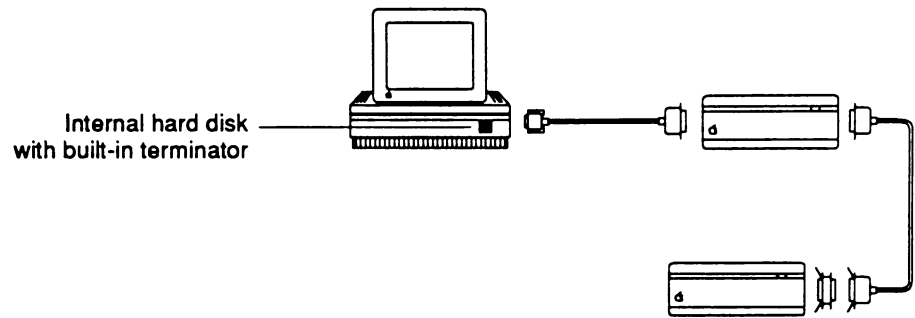
Internal hard disk
with built-in terminator

A. It is properly configured.
B. Add a Cable Terminator between the System Cable and the first device.
C. Remove the Cable Terminator between the Extender Cable and the last device.
D. Use a Peripheral Cable instead of the Cable Extender.
E. Add a Cable Terminator between the System Cable and the first device and use a Peripheral Cable instead of the Cable Extender.

Module Test

7. Is this system properly configured? If not, how should it be changed?
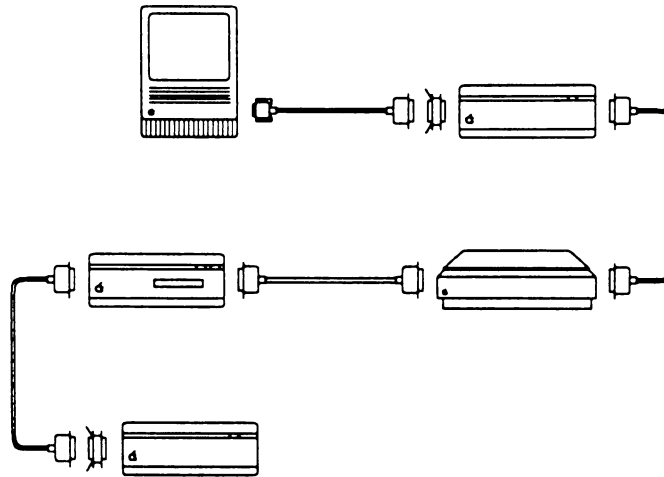
A. It is properly configured.
B. Remove the Cable Terminator between the System Cable and the first device.
C. Place a Cable Terminator before each device.
D. Use Cable Extenders instead of the Peripheral Interface Cables.

8. Is this system properly configured? If not, how should it be changed?
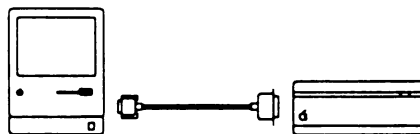
A. It is properly configured.
B. Add a Cable Terminator between the Macintosh and the System Cable.
C. Add a Cable Terminator between the System Cable and the device.
D. Add a Cable Terminator on the extra SCSI port of the device.
E. Add a Peripheral Cable and Cable Terminator between the System Cable and the device.

Module Test

9. A customer wants to connect two external SCSI hard disks, an Apple Scanner, and an Apple LaserWriter SC to a Macintosh IIcx which has an internal SCSI hard disk. The devices will be arranged as shown in the figure below.

Internal hard disk ————
with built-in terminator

Macintosh IIcx   Hard Disk   Hard Disk

8 feet

LaserWriter IISC   Apple Scanner
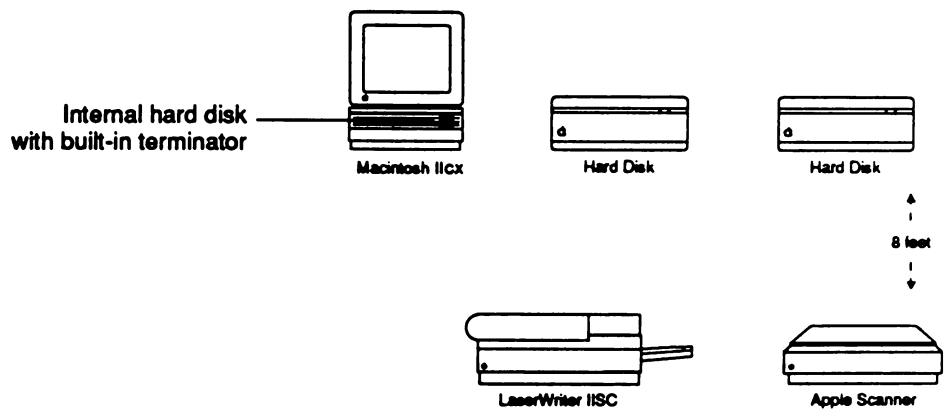
a. List the SCSI cables that the customer needs and state how many of each type are needed.

_____

_____

_____

b. How many SCSI Cable Terminators would the customer need?

_____

c. Where should the terminator(s) be placed?

_____

_____

Module Test

Directions

For items 10 through 15, indicate whether the statements are correct or incorrect by checking TRUE or FALSE.

10. A SCSI network should have a maximum of two Cable Terminators, but there is no limit for built-in terminators.

___ TRUE   ___ FALSE

11. Assign low priority numbers to the least-used devices.

___ TRUE   ___ FALSE

12. If you want to startup from a SCSI hard disk, assign priority 7 to both the computer and the hard disk.

___ TRUE   ___ FALSE

13. When you are setting up a SCSI network, set priority numbers before you plug in the devices.

___ TRUE   ___ FALSE

14. The devices that have terminators attached to them must be turned on for the SCSI network to communicate properly.

___ TRUE   ___ FALSE

15. You can not change the priority numbers on Macintosh computers.

___ TRUE   ___ FALSE

Compare your answers to those on the following pages.

Module Test (Answers)

Compare your answers to the following:

1. 7 SCSI devices

2. 20 feet

3. a. Yes, two devices on one SCSI network cannot have the same ID numbers. You would have to change the ID number of one external SCSI hard disk to 6.
   b. Use the Control Panel desk accessory to designate the internal SCSI hard disk as the startup disk.

4. B - System Cable
   C - Peripheral Cable
   A - Cable Extender

5. C

6. D

7. A

8. C

9. a. Cabled as shown in the figure below, the system would need:

   one System Cable
   three Peripheral Interface Cables
   two Cable Extenders

Module Test (Answers)

b. one SCSI Cable Terminator

c. Place the terminator between the last cable and the last device.

10. False - A system should never have more than two terminators whether they are built into a device or not.

11. True

12. False. **Never** assign the same SCSI ID (priority) number to two devices on one network.

13. True

14. True

15. True

Note: *Be sure you can perform all the tasks listed on the Skills Checklist before attending the Prerequisite Exam and the Lab part of this course.*

Table of Contents

Module Introduction

Overview

This module describes the hard disks in the Apple Hard Disk SC series and presents procedures for setting up an external Hard Disk SC with a Macintosh computer. During the Lab part of this course, you will learn how to take apart and troubleshoot a Hard Disk SC.

What You Will Learn

By the end of this module, you should be able to:

- Identify the basic capabilities of Apple SCSI Hard Disks
- Set up a SCSI hard disk with a Macintosh computer

The Skills Checklist following this Module Introduction lists, in detail, the tasks you should be able to perform upon completion of this module.

How You Will Be Tested

The Module Test – This written test will help you verify that you have achieved the tasks outlined in the Skills Checklist.

The Prerequisite Exam – Consisting of hands-on and written items, this test will verify that you have mastered the skills listed above and are ready for the Lab part of this course.

Throughout all of the tests and exercises, you will be able to refer to these instructional materials and to other Apple reference materials.

Prerequisites to the Module

Before beginning this module, you must have satisfactorily completed these modules:

- Welcome to Apple Service
- Macintosh Basic Features
- Setting Up Macintosh Computers
- Using Macintosh Computers
- Understanding SCSI

Materials provided with this Module

The Prerequisite provides the following items for this module:

- This Module Workbook
- Module Test

Module Introduction

Materials You Need to Provide

You need to provide the following:

- a Macintosh SE or IIcx system set up with a mouse and keyboard
- an external Apple Hard Disk SC (HD20 SC, HD40 SC, HD80 SC, or HD160SC)
- a Hard Disk SC power cable
- a SCSI System Cable and Cable Terminator
- the Hard Disk installation diskette (Each Hard Disk SC comes with a disk that contains a program to set up and initialize the hard disk. The name of the disk and the program can vary over time. Use a copy of the diskette that comes with the Hard Disk SC you will use for the exercises in this module.)

If you have an Apple Hard Disk SC Owner's Manual, you might want to refer to it throughout the hands-on exercises in this module.

How the Module Is Organized

This module is presented in two parts.

Part 1 - Capabilities—This part describes the hard disks offered in the Apple Hard Disk SC series, explains the differences and similarities between the external and internal hard disks, and explains which hard disks are compatible with the various Macintosh computers.

Part 2 - Setting Up an Apple Hard Disk SC—This part will guide you through the procedure for setting up an Apple HD SC with a Macintosh SE or IIcx.

Following these two parts is a Module Summary.

Continue with the Skills Checklist on the following pages.

Skills Checklist

What Is the Skills Checklist?

This is a list of tasks that you should be able to perform at the conclusion of this module. The Prerequisite Exam (written and hands-on) will cover these items. During the Lab part of this course, you will be expected to be able to perform all of these tasks.

How to Use the Checklist

Before starting the module, check the items on this list to see which tasks you can already perform. If you are confident that you can already perform certain tasks, you may decide to skip those parts of the module. Or you may decide to try the Module Test without going through the module.

After completing the module, check this list to make certain that you have mastered all of the skills before you attend the Prerequisite Exam and the Lab part of this course. If you feel uncertain about any of these tasks, return to the section indicated, review the information, and repeat the hands-on exercises.

Skills Checklist

	Task	Section Where the Task Is Covered
___	1. Identify the hard disks currently available from Apple and state their storage capacities.	Apple Hard Disk Capabilities
___	2. Indicate which hard disks are compatible with specific Macintosh computers.	Apple Hard Disk Capabilities
___	3. Explain two significant differences between internal hard disks and external hard disks (as shipped from the factory).	Apple Hard Disk Capabilities
___	4. Properly position an Apple hard disk in relation to a Macintosh computer.	Setting Up an Apple External Hard Disk with a Macintosh
___	5. Connect an external Apple Hard Disk SC to a Macintosh computer.	Setting Up an Apple External Hard Disk with a Macintosh
___	6. Initialize an external Apple Hard Disk SC with a Macintosh computer.	Setting Up an Apple External Hard Disk with a Macintosh
___	7. Make an external Apple Hard Disk SC a startup disk for a Macintosh computer.	Setting Up an Apple External Hard Disk with a Macintosh
___	8. Follow the recommended procedures for turning on and turning off a Macintosh system with an external hard disk.	Setting Up an Apple External Hard Disk with a Macintosh
___	9. Identify what the hard disk LED indicates.	Setting Up an Apple External Hard Disk with a Macintosh

Skills Checklist

	Task	Section Where the Task Is Covered
____	10. Explain why a hard disk formatted with a Macintosh may have to be reformatted before being used with another computer (or vice versa).	Setting Up an Apple External Hard Disk with a Macintosh
____	11. Explain how to connect more than one external hard disk to a system.	Setting Up an Apple External Hard Disk with a Macintosh
____	12. Explain how to designate a preferred startup disk if more than one hard disks contain startup information.	Setting Up an Apple External Hard Disk with a Macintosh

Apple Hard Disk Capabilities

Overview

This section explains the advantages of hard disks and describes the hard disks offered by Apple.

Hard Disk Drives

A hard disk drive is a device used to store large amounts of data. Hard disk drives record data in the same manner as a 3.5-inch floppy disk drive, but instead of recording the data on a flexible plastic diskette, hard disk drives record the data on rigid metal disks encased in the drive. Figure 1 illustrates a stack of hard disks.
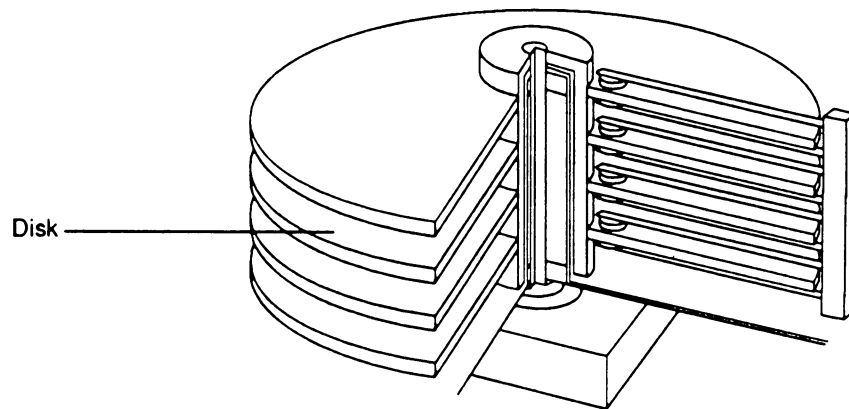
Disk ——————

Figure 1. A stack of hard disks

Apple Hard Disk Capabilities

Internal Hard Disks   When Apple hard disk drives are installed inside the computer case, they are called an "internal hard disk." Figure 2 shows an internal hard disk installed in a Macintosh II.
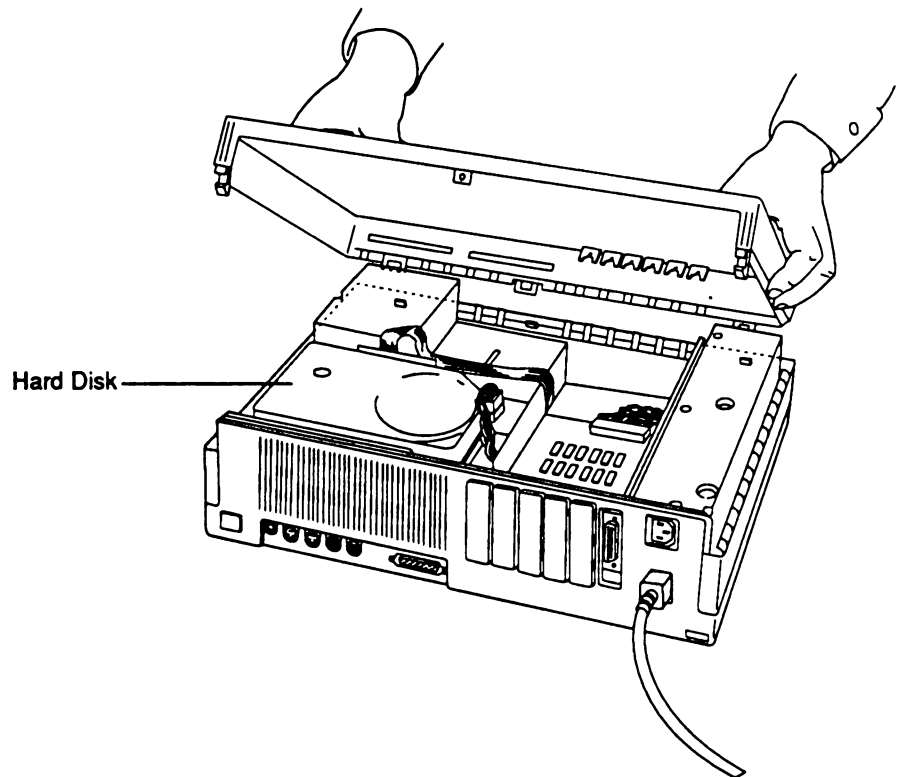
Hard Disk ————

Figure 2. An internal hard disk installed in a Macintosh II

Apple Hard Disk Capabilities

External Hard Disks   Hard disks can also be enclosed in a case with a power supply and fan. These "external hard disks" are connected to computers as a peripheral device, as shown in Figure 3.
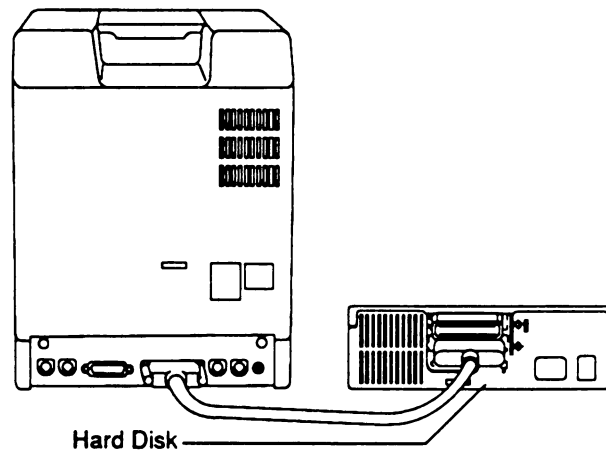
Figure 3. An external hard disk connected to an Macintosh SE

Apple Hard Disk Capabilities

Advantages of Hard Disks

Hard disks have at least two advantages over floppy disks.

- Hard disks can store much more data than floppy disks. Apple hard disks come in various capacities ranging up to 160 MB, compared to 800K to 1.44 MB that a floppy disk can store. (See Figure 4.)

Data Capacity

100MB

10MB

1MB
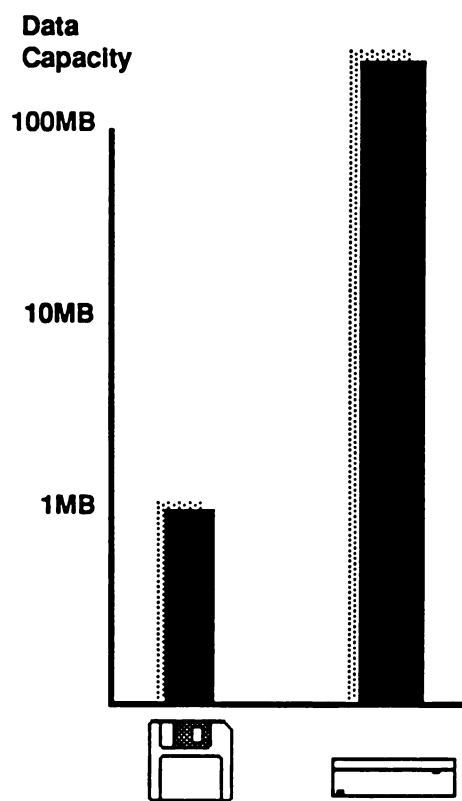
Figure 4. Comparison of storage capacity of a floppy disk and a hard disk

- Hard disk drives spin at much faster speeds so data can be written to and read from them much more quickly than with floppy disk drives. Figure 5 illustrates the comparison.

Apple Hard Disk Capabilities

Apple Hard Disk SC Series

The Apple Hard Disk SC series of hard disks can be used with any Apple computer equipped with SCSI (Small Computer System Interface). The Hard Disk SCs range in storage size from 20MB to 160MB, as indicated by their product names:

Apple Hard Disk 20SC
Apple Hard Disk 40SC
Apple Hard Disk 80SC
Apple Hard Disk 160SC

The replaceable module that contains the actual rigid disks that data is stored on is called a Hard Disk Assembly (HDA). Generally, HDAs come in two sizes—3.5-inch and 5.25-inch.

External Hard Disk SCs

All of the Hard Disk SCs can be used as external hard disks with any of the Macintosh computers. When shipped in their external configurations, the hard disks look alike except for their labels, as shown in Figure 6.
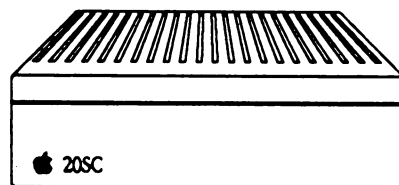
Apple HD 20SC
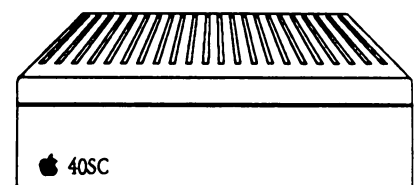
Apple HD 40SC
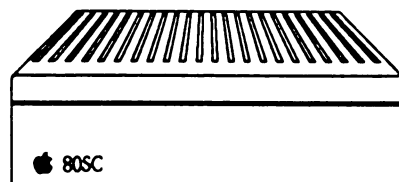
Apple HD 80SC
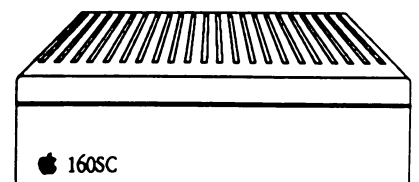
Apple HD 160SC

Figure 6. The Apple Hard Disk SC series

Apple Hard Disk Capabilities

The connectors and switches on the back panel of the external hard disks are also alike, as shown in Figure 7.

SCSI Ports
SCSI Priority switch
AC Power connector
Power switch
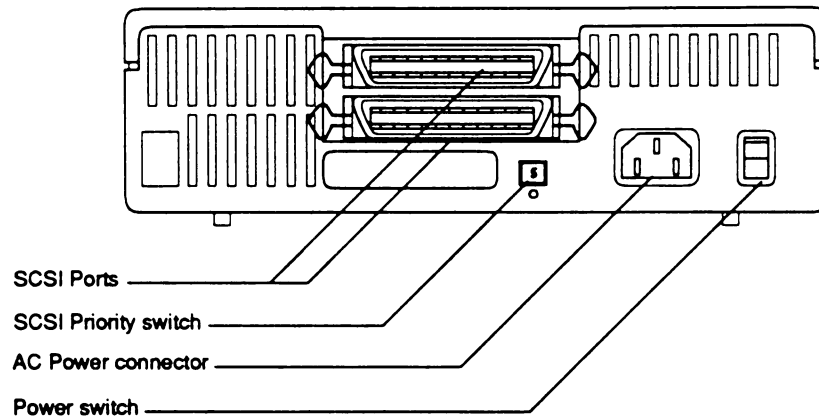
Figure 7. Back panel of a Hard Disk SC

Internal Hard Disk SCs

Both 3.5-inch and 5.25-inch Hard Disk SCs can be installed in the Macintosh II and IIx. Because they are physically smaller, Macintosh SE, IIcx and Macintosh IIci computers can use only the 3.5-inch hard disk SCs. Macintosh Plus computers can not have internal SCSI hard disks.

Differences Between Internal and External Hard Disks

As shipped from the factory, internal and external Hard Disk SCs differ in two significant ways:

1) Internal hard disk assemblies have built-in terminators (resistor packs). External hard disk assemblies do not have built-in terminators.

2) On Apple internal hard disk assemblies, the SCSI priority number is factory set at 0. On Apple external hard disks, it is set at 5.

Apple Hard Disk Capabilities

Most HDA replacement modules are shipped in the internal configuration. To reconfigure an internally configured HDA for external use, you will probably need to change the SCSI priority number and remove the built-in terminating resistors.

Previous Models

Apple used to offer a non-SCSI hard disk drive for the Macintosh. Although Apple no longer sells this hard disk, your customers may have one of them and ask you to service it. So that you can recognize this model, here is a brief description.

Apple HD20

The Apple HD20, shown in Figure 8, is an external 20MB hard disk that can be used with the Macintosh Plus. It is not a SCSI device but instead has a serial interface. It connects to the external disk drive port and contains a daisy-chain port so that you can connect a Macintosh external disk drive to it.
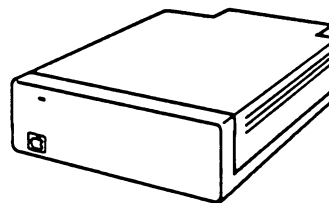
Figure 8. The Apple HD20 external hard disk

Continue with the next section - Exercise: Apple Hard Disk Capabilities.

Exercise: Apple Hard Disk Capabilities

Answer the following questions as indicated.

1. What are two advantages to using hard disks instead of floppy disks?

   1) _____

   2) _____

2. Which of the *external* Hard Disk SCs can each of the following computers use? Indicate your answers by checking the spaces provided.

	HD20SC	HD40SC	HD80SC	HD160SC
Macintosh Plus	____	____	____	____
Macintosh SE	____	____	____	____
Macintosh IIcx	____	____	____	____

3. Which Macintosh computers can support internal 3.5-inch hard disks? Check all correct answers.

   ___ A. Macintosh Plus
   ___ B. Macintosh SE
   ___ C. Macintosh SE/30
   ___ D. Macintosh II and Macintosh IIx
   ___ E. Macintosh IIcx and Macintosh IIci

4. Which Macintosh computers can support internal 5.25-inch hard disks? Check all correct answers.

   ___ A. Macintosh Plus
   ___ B. Macintosh SE
   ___ C. Macintosh SE/30
   ___ D. Macintosh II and Macintosh IIx
   ___ E. Macintosh IIcx and Macintosh IIci

Exercise: Apple Hard Disk Capabilities

5. Which of the Hard Disk SCs come from the factory with internal SCSI terminating resistors? Check the correct answer.

    ___ A. internal Hard Disk SCs
    ___ B. external Hard Disk SCs
    ___ C. both internal and external Hard Disks SCs

6. What is the factory-set SCSI priority number for:

    a) internal Apple hard disks? _____

    b) external Apple hard disks? _____

Compare your answers to those on the next page.

Exercise: Apple Hard Disk Capabilities (Answers)

Compare your answers to the statements below.

1. 1) Hard disks can store more data.
   2) Hard disks drives process data faster.

2.

	HD20SC	HD40SC	HD80SC	HD160SC
Macintosh Plus	X	X	X	X
Macintosh SE	X	X	X	X
Macintosh IIcx	X	X	X	X

3. ___ A. Macintosh Plus
   _x_ B. Macintosh SE
   _x_ C. Macintosh SE/30
   _x_ D. Macintosh II and Macintosh IIx
   _x_ E. Macintosh IIcx and Macintosh IIci

4. ___ A. Macintosh Plus
   ___ B. Macintosh SE
   ___ C. Macintosh SE/30
   _x_ D. Macintosh II and Macintosh IIx
   ___ E. Macintosh IIcx and Macintosh IIci

5. A

6. a) internal Apple hard disks — 0
   b) external Apple hard disks — 5

Exercise: Apple Hard Disk Capabilities (Answers)

If you missed one or more of the items of this exercise, review the section "Apple Hard Disk Capabilities".

Otherwise....

Continue with the next section - Setting Up an Apple External Hard Disk with a Macintosh.

Setting Up an Apple External
Hard Disk SC with a Macintosh

Overview

In this exercise, you will set up an external Apple Hard Disk SC with a Macintosh computer. You will:

- Connect the hard disk to the computer
- Initialize the hard disk
- Create a startup disk

The section concludes with directions for connecting additional SCSI hard disks.

What You Will Need

To complete this exercise, you will need the following:

- a Macintosh SE or a Macintosh IIcx set up with mouse and keyboard
- an external Hard Disk SC of any capacity
- SCSI system cable
- SCSI terminator
- a power cable
- Hard Disk SC Setup diskette

Handle With Care

Hard disks are mechanical devices with moving parts. You must handle them with care. Whether the hard disk is operating or not, rough handling—such as dropping, jarring, or bumping—can cause the read-write heads to contact the disk, damaging the data and the disk surface. This is known as a "head crash." Careless handling accounts for more hard disk drive failures than all other factors combined.

Here are some guidelines for handling hard disks:

- Leave hard disk drives in their shipping containers until you need them.

- Place the hard disk drive on a soft, grounded surface before beginning any repairs.

- Use the original shipping containers and packing materials when transporting HDAs.

- Never move the drive while it is running or during power-down. After power is turned off, the disks slow down, and (within 30 seconds) the heads move to a safe position. Any jolts to the drive during the power-down period may cause the heads to crash.

- Never drop a hard disk drive. Even a slight drop could cause drive failure.

Setting Up an Apple External Hard Disk SC with a Macintosh

Placement of the Hard Disk

When positioning an external hard disk with a computer, follow these rules:

- Do not block the air vents at the sides and back of the unit. These vents ensure proper ventilation while the hard disk is on.

- Always place hard disks right side up. Never place a Hard Disk SC on its side.

- Do not place a hard disk to the left of a computer. The left side of Apple computers contain power and video circuitry that could form a local magnetic field. This field could interfere with the normal operation of the hard disks.

Place hard disks flat, on the right hand side of the computer or above or below the computer. Figure 9 shows correct and incorrect ways to position the hard disks.
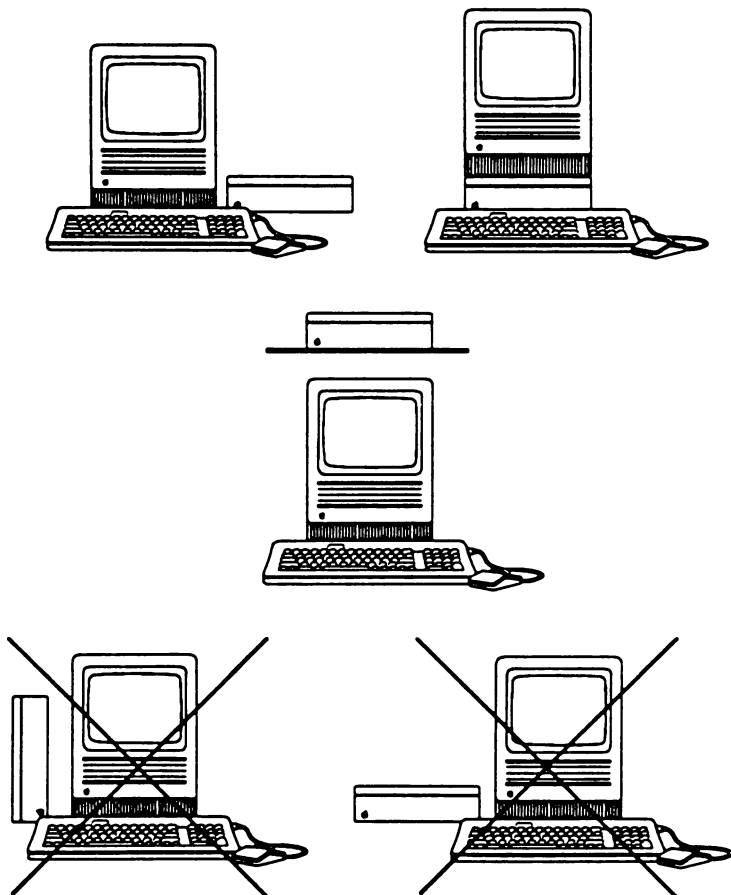
Figure 9. Correct and incorrect ways to position a hard disk with a Macintosh computer

Setting Up an Apple External Hard Disk SC with a Macintosh

Cable Connections

Perform the following steps now to connect the hard disk to the Macintosh:

1. Check the SCSI priority number (the SCSI priority switch). If necessary, change the number.

    The factory-setting is 5. Each device on a SCSI network must have a unique number. Usually higher numbers are assigned to hard disk drives. Unless you have reason to do otherwise, you would assign number 6 to the first Hard Disk SC, number 5 to a second one, and so on in descending order. (For further explanation on SCSI priority numbers, see the module "*Understanding SCSI*.")

    If you have to change the number, insert a jeweler's screwdriver or unwound paper clip into the hole below the priority switch, as shown in Figure 10. Push gently. The numbers increase. If you go past the number you want, keep pushing gently until you cycle around to your choice.

SCSI Priority switch
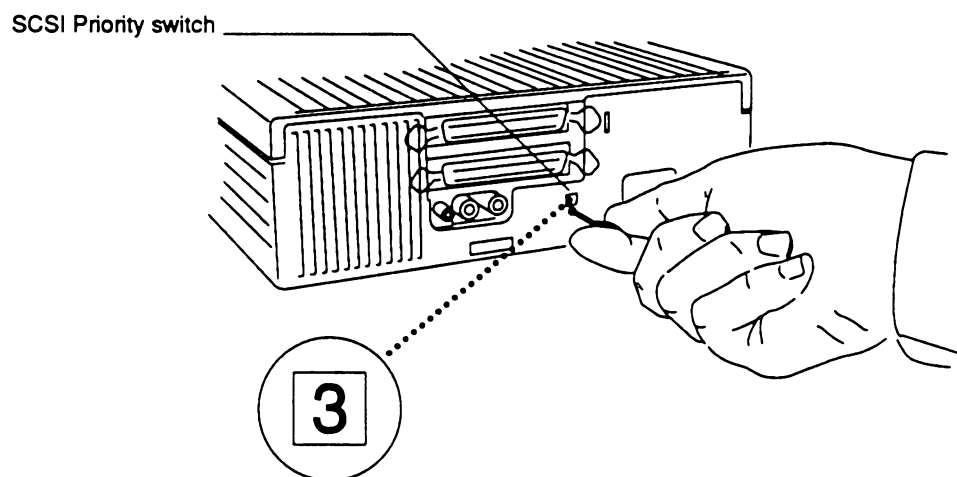
Figure 10. The Hard Disk 20SC priority switch

Setting Up an Apple External Hard Disk SC with a Macintosh

2. Place your Hard Disk SC to the right of the Macintosh.

Steps 3 through 6 direct you to connect the SCSI System Cable and the Cable Terminator, as shown in Figure 11. Although the figure shows a Macintosh SE, the procedure is the same for every Macintosh.

Macintosh SCSI port —————
Small end of System Cable ———

Hard Disk SC SCSI ports
Cable Terminator —————
Large end of System Cable ——
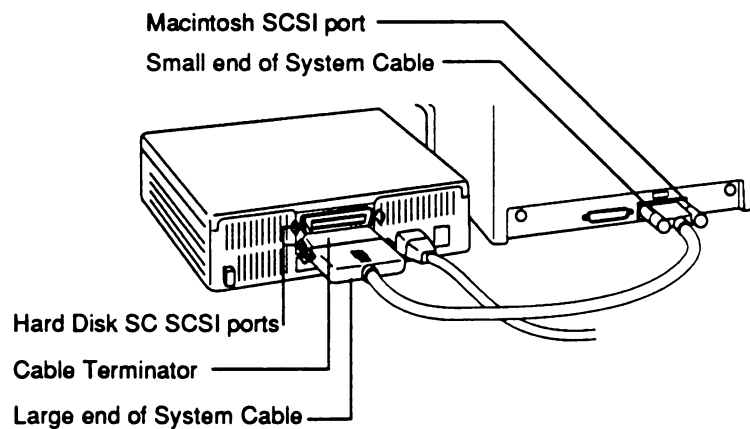
Figure 11. Hard Disk SC correctly connected to a Macintosh SE

Caution: *The Macintosh power must be turned off when you connect any SCSI device.*

3. Without touching the metal pins in the SCSI connector, plug the DB-25 connector of the System Cable into the SCSI port on the back of the Macintosh.

Some SCSI System Cables have thumbscrews that you tighten with your fingers.

Setting Up an Apple External Hard Disk SC with a Macintosh

4. Plug the terminator into the end of the System Cable.

    Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection.

5. Plug the System cable into either port on the back of the Hard Disk SC.

    Press the diamond-shaped wire clips toward the connector, snapping them into the clip brackets to secure the connection.

    Be sure that both the computer and the hard disk are still turned off as you continue with the next step.

6. Connect the power cable to the hard disk and to a three-pronged power outlet.

Check the Connections

Before you proceed with powering up the system, check your connections. If they are incorrect, you could damage the hard disk.

Power Up

When turning on a system that has an external hard disk, **always power on the external hard disk before the computer.** The disk motor needs to spin up to operational speed before the drive is ready to be accessed by the computer.

When you power up an Apple Hard Disk SC, you should hear the hard disk fan. The LED at the front of the hard disk will light briefly, then go out. When all circuits are ready and the motor speed is constant (about 10 to 20 seconds after the hard disk is turned on), the drive is ready for operation. Depending on the manufacturer and model, the hard disk may emit one or more quiet beeps when it is ready for operation.

The LED does not come on steady when the drive is ready. The LED blinks when the hard disk is reading or writing data; otherwise the light remains off even though the hard disk is on.

Setting Up an Apple External Hard Disk SC with a Macintosh

7. Now power on the hard disk. Watch and listen for indications that it is starting up.

   Do not turn on the Macintosh yet.

Initializing a Hard Disk

Right out of the box, all Apple hard disks are completely blank. The computer will not even recognize the hard disk as being a storage volume. The hard disk must be prepared to receive information, or "initialized."

Basically, initializing a disk does the following:

- Completely erases any data on the disk

- Formats the hard disk to store data

- Runs a test to verify that the hard disk is OK

- Installs the hard disk device driver, which lets the Macintosh and the hard disk send and receive files

  As you learned in the *"Using Macintosh Computers"* module, all peripheral devices use device drivers to communicate with the computer.

If you have connected the cables to your computer and hard disk, and you have powered on the hard disk, you are now ready to intialize the hard disk. Each Apple Hard Disk SC comes with an installation diskette. The diskette contains the HD SC Setup application program which you will use to initialize the hard disk you have set up.

Steps 8 through 14 will guide you through the initialization procedure, using the setup disk that comes with the Hard Disk SC.

8. Insert a copy of the Hard Disk SC Setup disk in the Macintosh internal disk drive. (The name of this disk may change over time, but a setup disk and initialization directions are always provided with each new Hard Disk SC.) You can also use the HD SC Setup program on the Macintosh System Tools Disk.

9. Switch on the Macintosh.

Setting Up an Apple External Hard Disk SC with a Macintosh

10. Launch the HD SC Setup program by double-clicking its icon.

A dialog box appears, as shown in Figure 12.

```
 Apple HD SC Setup    U2.0

 ┌─────────────┐
 │  Initialize │      SCSI Device: 5
 └─────────────┘
 ┌─────────────┐      ┌─────────────┐
 │   Update    │      │    Drive    │
 └─────────────┘      └─────────────┘
 ┌─────────────┐
 │  Partition  │
 └─────────────┘
 ┌─────────────┐
 │    Test     │
 └─────────────┘
 ┌─────────────┐
 │    Quit     │
 └─────────────┘
 ........................................................
  [icon]  The volume name is HD 20SC
```
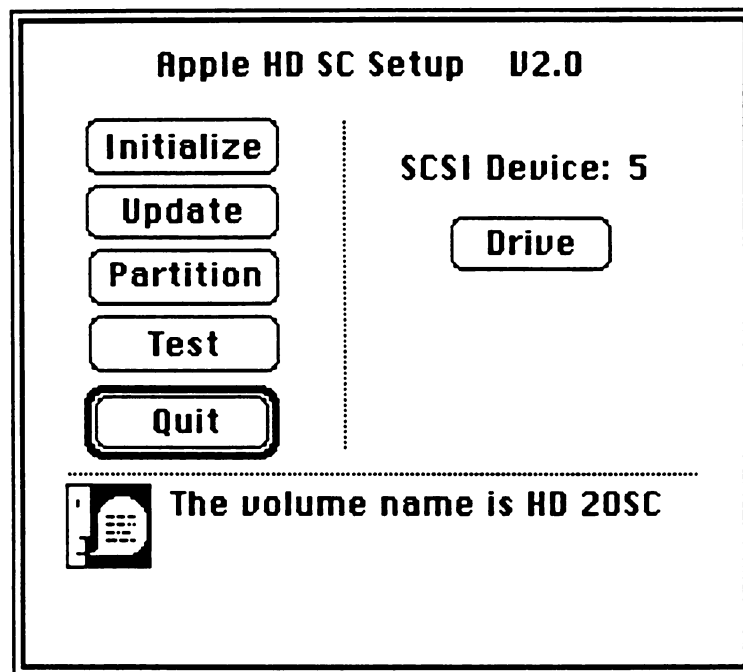
Figure 12. The Apple HD SC Setup dialog box

Note the six buttons in the dialog box: Initialize, Update, Partition, Test, Quit, and Drive.

Update button - This button has two uses:

• To reinstall the current driver program, if the driver on the hard disk becomes damaged.

• To install a new version of the driver program, if one becomes available.

You can update the driver program without losing any data.

Setting Up an Apple External
Hard Disk SC with a Macintosh

Partition button— You can divide a hard disk into partitions. With this advanced feature you can create partitions to store information from other types of computers or different operating systems. You might also create partitions for use with different users or types of data, for example, accounting versus sales. (You can find complete directions for creating partitions in the *Macintosh Utilities User's Guide.*)

Test button — This button is used to test hard disks and is explained in a later module.

Drive button —If you have two or more SCSI hard disks connected to the Macintosh, you can select a different one by clicking the drive button. As you click this button, the SCSI device number above the button changes to match the hard disk selected. You must make certain that the SCSI number in the dialog box matches the priority number of the disk drive you want to initialize.

Quit button —This button allows you to quit the hard disk set-up program and to return to the desktop.

12. Click Initialize.

A dialog box appears, reminding you that initializing will erase all of the data on the hard disk. To continue, click Init. Initialization takes several minutes; the exact length of time depends on the size of the hard disk and the type of computer. Messages appear in the Setup window, explaining the course of the initialization. The hard disk light is on or flickers during initialization.

Setting Up an Apple External Hard Disk SC with a Macintosh

13. Name the disk, and press the Return key.

When initialization is complete, you are asked to name the disk. Disk names can contain up to 27 characters. You can use any character you can type on the keyboard, except colons (:). If the hard disk has been initialized before, you will not be asked to name it.

14. Click Quit.

You return to the desktop, where the Hard Disk SC icon appears and is labeled with the name you gave it.

Tracks and Sectors

As explained in the *Using Macintosh Computers* module, when you initialize or format a hard disk, the magnetic surface of the disk is divided into concentric circles called tracks, and each track is divided into sectors as shown in figure 13. This grid of tracks and sectors is set up so that the computer's operating system can locate data on the hard disk.
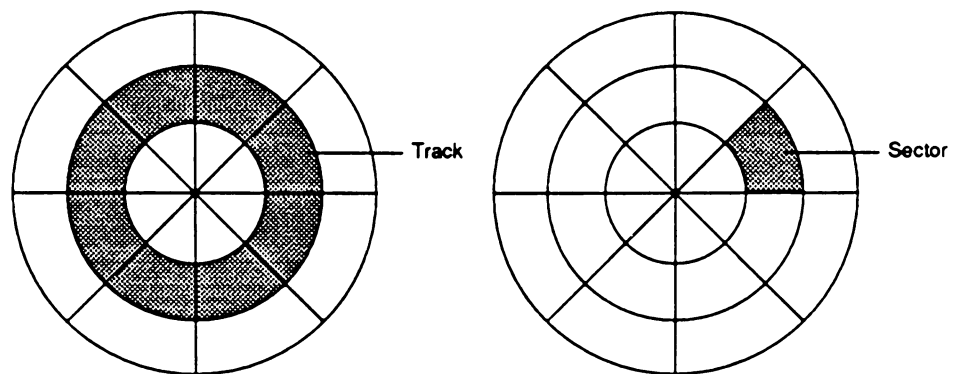
Figure 13. Tracks and Sectors on a Disk

Setting Up an Apple External Hard Disk SC with a Macintosh

Interleave Ratio

Interleave ratio is the ratio of consecutive sectors on a disk that a computer can read from or write to. The interleave ratio differs across different types of computers. Generally, computers with faster speeds have smaller interleave ratios. For example, assume these Apple computers have the following interleave ratios:

Computer	Interleave Ratio	Speed
Apple IIe	3:1	fast
Macintosh Plus	2:1	faster
Macintosh II	1:1	fastest

This means that the Macintosh II is fast enough to read from or write to every consecutive sector, the Macintosh Plus can only read or write on every other sector, and the Apple IIe is only fast enough to read or write on one in every three sectors.

Performance delays occur when you connect a "slower" computer to a hard disk initialized on a "faster" computer. For example, a hard disk intialized on a Macintosh II has data on more consecutive sectors than a Macintosh Plus can consecutively read. The Macintosh Plus would have to complete a second full revolution of the disk to access the sectors it missed on the first revolution. There is also a delay when the "faster" computer accesses a hard disk intialized by the "slower" computer.

To get maximum performance from a hard disk, use the hard disk only with the computer it was initialized on. If you need to use a hard disk with another computer (other than the one it was initialized on), back up the data and reinitialize the hard disk with the computer you plan to use.

Setting Up an Apple External Hard Disk SC with a Macintosh

Creating a Startup Disk

If the hard disk is to be used as a startup disk, the next step is to load the required system files onto the disk. As you learned in the module *Using Macintosh Computers*, a startup disk is any disk—floppy or hard—that contains all the software files necessary to boot the computer.

The procedure for making a hard disk a startup disk is the same whether you are working with an internal or external hard disk. You copy all of the required startup files to the hard disk.

Having initialized your hard disk, you can now make it a startup disk by following steps 15 through 18.

15. Using the Installer application on the Macintosh System Tools Disk, Install the Macintosh System Software on the hard disk.

16. Copy any applications and documents onto the hard disk.

    If any of these are protected, you may not be able to copy them or you may be asked to insert a master disk in the internal disk drive each time you start up the hard disk.

17. If necessary, use the Installer to update system files or install resources in the System Folder.

18. Remove the Hard Disk SC Installation disk and store it in a safe place.

    If you need to test the hard disk or install a new version of the driver program, you will need the Hard Disk 20SC Installation disk.

    If you are using more than one hard disk, use the Control Panel to set the Startup Device.

19. Select Shut Down from the Special menu. Switch off the computer.

20. Switch off the hard disk. Turning off the computer before the hard disk guarantees that no data transfer is occurring during power down.

Setting Up an Apple External Hard Disk SC with a Macintosh

Booting From the Hard Disk

When you boot a Macintosh computer, the system will check for startup information in the following sequence:

a) The lower internal disk drive—On Macintosh II computers, this is the drive on the right side.
b) The upper internal disk drive, if one is installed—On Macintosh II computers, this is the drive on the left.
c) Any external non-SCSI drives, either 3.5-inch drives or external hard disks
d) Any startup device selected via the Startup Device CDEV in the Control Panel
e) Any SCSI drives, in descending order of their set priority numbers

If you want to boot the computer from the hard disk, do not insert a 3.5-inch diskette until the Macintosh is operating. If a 3.5-inch disk containing a System Folder is inserted when you switch on the computer, the 3.5-inch disk becomes the startup disk.

Whenever you boot a hard disk, you should watch it power up so that you learn to recognize the indications that it is functioning properly. How does a functioning hard disk sound and what does its LED look like? Being able to identify normal indications will help you recognize abnormal ones when you are troubleshooting systems with hard disks.

Now, try booting from the hard disk.

21. Switch on the hard disk.

22 Wait at least 10 seconds while the hard disk warms up.

23. Switch on the Macintosh.

When switching on a Macintosh with a hard disk, always follow the three steps given above.

Setting Up an Apple External Hard Disk SC with a Macintosh

If the Macintosh successfully boots from the hard disk, the icon for the hard disk will appear in the upper right hand corner of the desktop—indicating that the hard disk is the current startup device, as shown in Figure 14.

```
 File   Edit   Uiew   Special
```
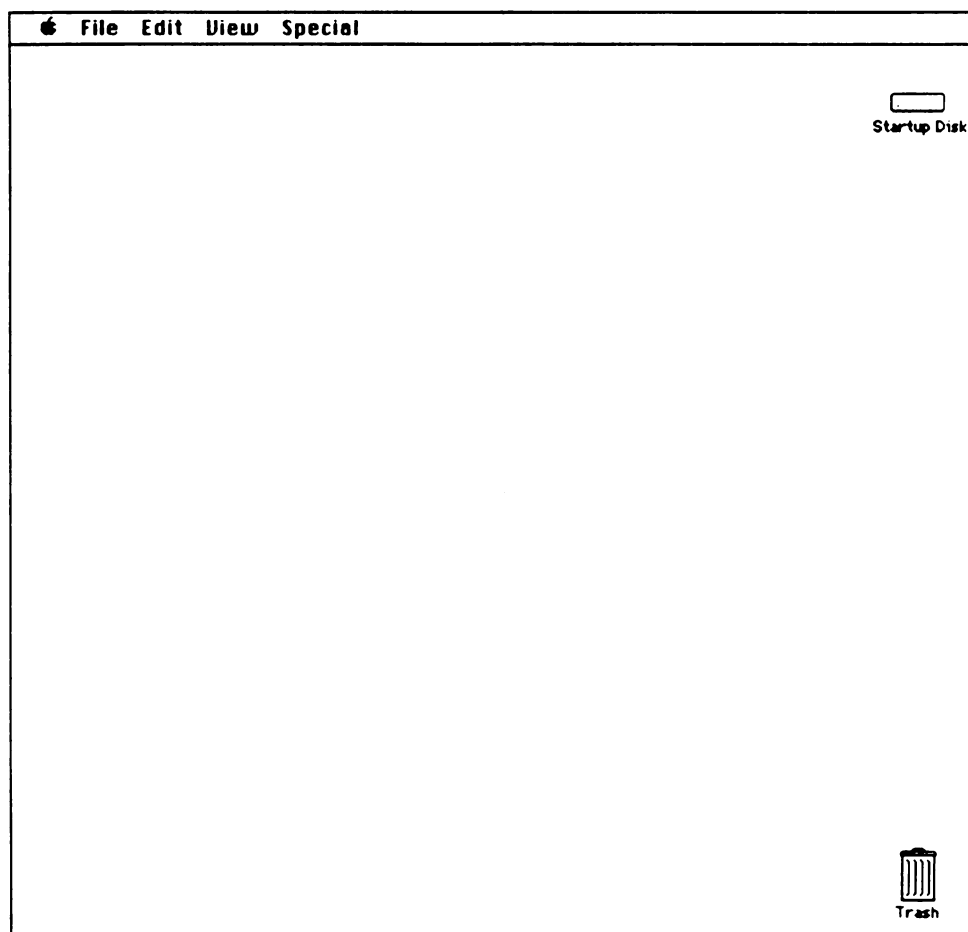

Figure 14. Icon in upper right corner indicates the startup disk

Power Down

You can leave the SCSI hard disk on and unused for several days; it draws very little power. When you will not be using it for a week or more, or when you want to connect it to (or disconnect it from) the computer or another SCSI hard disk, you should switch it off. Whenever you want to switch off a hard disk, do it in the following way:

1) Quit the application you are working in and return to the desktop.

2) Choose Shut Down from the Special menu.

Setting Up an Apple External
Hard Disk SC with a Macintosh

3) Switch off the computer.

4) Switch off the SCSI hard disk.

Never switch off the SCSI hard disk while the light is blinking. You may lose information on the hard disk.

You can switch off your computer and hard disk now. Remember to turn off the computer first, then turn off the hard disk.

Adding a Second Hard Disk

You can add one or more SCSI Hard Disks to your system by attaching them with an SCSI peripheral interface cable (and an SCSI cable extender or cable terminator, if necessary).

To connect a second SCSI hard disk to the original one, follow these steps: (You do not have to perform these steps at this time.)

1. Switch off the computer.

2. Switch off the first SCSI hard disk.

3. Make sure the second hard disk has a different ID number than the first and add a terminator.

4. Attach the second hard disk to the first with an SCSI peripheral interface cable.

Notice that the second hard disk connects to the first, not to the computer, as shown in Figure 15.
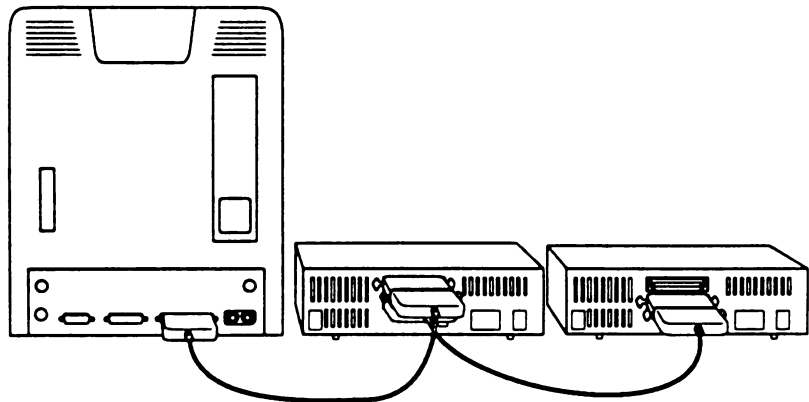
Figure 15. Connecting two hard disks to a Macintosh SE

Setting Up an Apple External Hard Disk SC with a Macintosh

5. Make sure Cable Terminators are connected appropriately.

6. Switch on both hard disks in any order.

7. When they have each been on at least 10 seconds, switch on the computer.

8. Insert the Hard Disk Installation disk in the internal disk drive of the Macintosh.

9. Repeat the initialization procedure. You do not copy the system startup files to the second hard disk unless you want to make it a startup disk.

10. If more than one hard disk contains startup information, you can select the preferred startup disk in the Control Panel, as shown in Figure 16. this gives you the convenience of switching startup devices to meet different application needs.
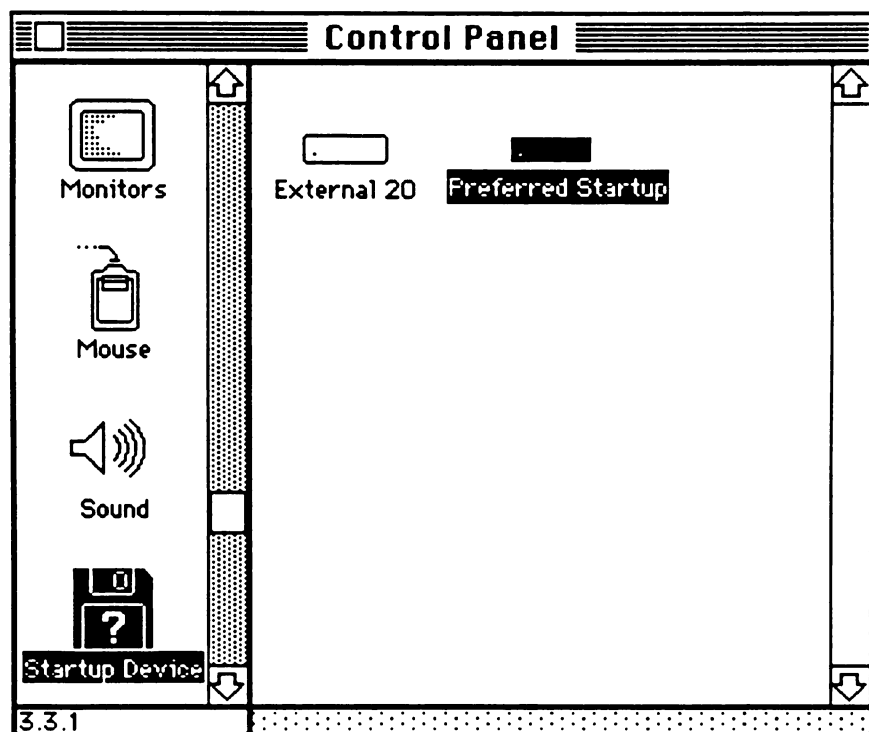
Figure 16. Using the Control Panel to designate the startup disk

Setting Up an Apple External Hard Disk SC with a Macintosh

If you connect more than two Hard Disk SCs, connect the third hard disk to the open SCSI port on the second hard disk, and connect the fourth hard disk to the open SCSI port on the third hard disk. Remember to check priority numbers and termination before powering up

Remember—if a system has more than one hard disk containing the System File, you should use the Control Panel to designate the preferred startup disk.

References

Here are some references that you might want to look at for details about setting up Hard Disk SCs with Macintosh computers:

- Apple Hard Disk SC Manual
- Apple SCSI Cable System manual
- Apple Service Technical Procedures manuals

Continue with the next section - Module Summary.

Module Summary

Advantages of Hard Disks

Hard disks have two key advantages over floppy disk drives:

1) Hard disks can store many times more data than floppy disks.

2) Hard disk drives read and write data much more quickly than can floppy disk drives.

Hard Disk Uses

Users can store system software, applications, documents, fonts, and DAs on their hard disks. This eliminates the need to switch from one diskette to another while working with the computer.

Placing the System File and Finder application on the hard disk makes it a startup disk. Booting from a hard disk is much faster than booting from floppy diskettes and also eliminates the need for using diskettes.

Apple Hard Disks

The hard disks currently offered by Apple are all SCSI hard disks. This Hard Disk SC series includes 3.5-inch and 5.25-inch drives. They range in storage size from 20MB to 160MB.

The Hard Disk SCs with 3.5-inch HDAs can be installed as internal hard disk drives in the Macintosh SE, SE/30 and Macintosh II line of computers. The Hard Disk SCs with 5.25-inch HDAs can be installed as internal hard disk drives only in the Macintosh II and Macintosh IIx.

The internal and external configurations of the Hard Disk SCs differ in two significant ways:

1) The Apple internal hard disk assemblies have built-in terminating resistor packs that serve as SCSI terminators. External Apple hard disk assemblies do not have built-in terminators.

2) The SCSI priority numbers on internal hard disks are factory set at 0 (zero), and the priority numbers on external hard disks are factory set at 5.

This means that if you reconfigure an internal hard disk for external use, you will probably have to change the SCSI priority number and may have to remove the terminating resistor packs.

Module Summary

Handling and Positioning Hard Disks

You must handle hard disks with care because they have mechanical parts. Rough handling can cause a malfunction or damage the information on the disk.

To allow for proper ventilation, you must position the Hard Disk SCs flat. Do not place them to the left of an Apple computer because of the risk of magnetic interference from the computer's power supply and video circuitry.

Connecting an External Hard Disk SC with a Macintosh

Setting up a Hard Disk SC to a Macintosh involves these basic steps:

1. Make certain that the SCSI priority number on the hard disk is unique.

2. Connect a SCSI System Cable to the hard disk and to the computer.

3. Add a SCSI terminator (only if needed).

4. Initialize the hard disk.

5. If appropriate, make the hard disk a startup disk by copying system software to the hard disk.

Powering On a Hard Disk

Always turn on the hard disk before the computer. Allow the hard disk at least 10 seconds to get up to speed.

Powering Off a Hard Disk

Hard disks use little power, so you can leave them on when unused. If you plan to leave the disk unused for a week or more, you can turn it it off. Always turn the computer off first, then the hard disk. Never switch off a hard disk when the LED is blinking.

Module Summary

Initialization

Initializing or formatting a hard disk:

- Completely erases any data on the disk
- Format the hard disk to store data
- Runs a test to verify that the disk is OK
- Installs the driver program in the computer

"Interleave ratio" refers to the ratio of consecutive sectors a computer can read and write to. Because different computers use different interleave ratios, you need to format a hard disk with the computer the hard disk will be used with.

If you have to reformat a hard disk for use with a different computer, you may have to re-initialize the hard disk. Reinitializing erases everything on the hard disk, so you will do it only with good reason. Hard Disk SC Setup program on the Macintosh gives you the option to reformat hard disks without re-initializing them.

Setting Up Multiple Hard Disks

To connect more than one external hard disk to an Apple computer, connect the second hard disk to the first with an SCSI peripheral interface cable. Likewise, connect a third hard disk to the second, and the fourth hard disk to the third.

If multiple hard disks contain startup information, you should use the Control Panel desk accessory to designate the appropriate hard disk as startup disk.

You have completed this module.

Check your skills and knowledge against the Skills Checklist for this module. When you are ready, take the Module Test.

Module Test

Directions

Directions are provided throughout this test. Follow them carefully.

For items 1 through 6, check all correct answers.

1. Which of the following Hard Disk SCs can be installed inside a Macintosh SE?

   — A. HD20SC, 3.5-inch
   — B. HD40SC, 3.5-inch
   — C. HD160SC, 5.25-inch
   — D. HD40SC, 5.25-inch
   — E. HD80SC, 5.25-inch
   — F. None of the above

2. Which of the following Hard Disk SCs can be installed inside a Macintosh IIcx?

   — A. HD20SC, 3.5-inch
   — B. HD40SC, 3.5-inch
   — C. HD80SC, 3.5-inch
   — D. HD80SC, 5.25-inch
   — E. HD160SC, 5.25-inch
   — F. None of the above

3. Which of the following Hard Disk SCs can be installed inside a Macintosh Plus?

   — A. HD40SC, 3.5-inch
   — B. HD80SC, 3.5-inch
   — C. HD160SC, 5.25-inch
   — D. HD80SC, 5.25-inch
   — E. HD40SC, 5.25-inch
   — F. None of the above

4. Which of the following Hard Disk SCs can be used as an external hard disk with a Macintosh SE/30?

   — A. HD20SC, 3.5-inch
   — B. HD40SC, 3.5-inch
   — C. HD40SC, 5.25-inch
   — D. HD80SC, 5.25-inch
   — E. HD160SC, 5.25-inch
   — F. None of the above

Module Test

5. Which of the following Hard Disk SCs can be used as an external hard disk with a Macintosh Plus?

___ A. HD20SC, 3.5-inch
___ B. HD80SC, 3.5-inch
___ C. HD20SC, 5.25-inch
___ D. HD80SC, 5.25-inch
___ E. HD160SC, 5.25-inch
___ F. None of the above

6. Which of the following Hard Disk SCs can be connected as an external hard disk with a Macintosh IIx?

___ A. HD20SC, 3.5-inch
___ B. HD40SC, 3.5-inch
___ C. HD160SC, 5.25-inch
___ D. HD80SC, 5.25-inch
___ E. HD20SC, 5.25-inch
___ F. None of the above

Module Test

Answer items 7 through 13 as directed.

7. Which of the following are acceptable arrangements for a Macintosh computer and an external Hard Disk SC? Circle all correct answers.

A
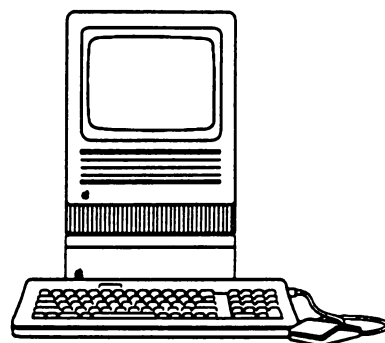
B

C
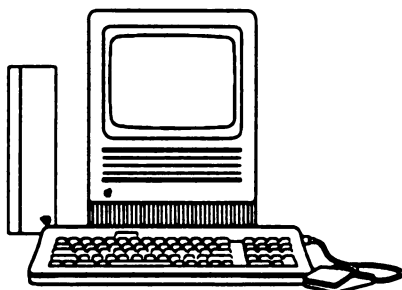
D
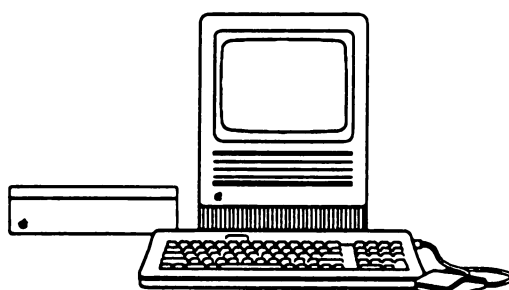
E

Module Test

8. How should you power up a system with an external Hard Disk SC? Check the recommended procedure.

___ A. Turn the computer and the hard disk on simultaneously.

___ B. Turn on the computer, and then immediately turn on the hard disk.

___ C. Turn on the hard disk, and then immediately turn on the computer.

___ D. Turn the computer on first, wait until it warms up, and then turn on the hard disk.

___ E. Turn the hard disk on first, wait until it warms up, and then turn on the computer.

9. How should you power down a system with an external Hard Disk SC? Check the recommended procedure.

___ A. Turn the computer and the hard disk off simultaneously.

___ B. Turn off the computer, and then turn off the hard disk.

___ C. Turn off the hard disk, and then turn off the computer.

___ D. Turn the computer off first, wait at least 20 minutes, and then turn off the hard disk.

___ E. Turn the hard disk on first, wait at least 20 minutes, and then turn off the computer.

10. After you connect a new Hard Disk SC to a Macintosh computer, what do you have to do to the hard disk so that the computer will recognize the disk as a storage device? Check the best answer.

___ A. Name the hard disk

___ B. Initialize the hard disk

___ C. Select the appropriate interleave ratio on the Control Panel

___ D. Designate the hard disk as startup device on the Control Panel

Module Test

11. What does it mean when the Hard Disk SC LED blinks on and off? Check all correct answers.

____ A. The hard disk has speeded up and is ready to be used.

____ B. The hard disk is reading or writing data.

—— C. The hard disk is in a "power saving" mode.

____ D. The hard disk is malfunctioning.

12. How does a hard disk that is a startup disk differ from a hard disk that is not a startup disk? Check all correct answers.

____ A. The startup hard disk is initialized with a special format.

—— B. The startup hard disk must be installed inside the computer.

—— C. The startup hard disk contains the System File and Finder application.

—— D. The startup hard disk must have an interleave ratio of 1:1.

—— E. The startup hard disk must be connected directly to the computer.

13. How do internal hard disks differ from external hard disks—as shipped from the factory? Check all correct answers.

____ A. Internal hard disks have built-in resistor packs (terminators).

____ B. Internal hard disks have 3.5-inch drives, and external hard disks can have either 3.5-inch or 5.25-inch drives.

____ C. External hard disks are SCSI devices, and internal hard disks are not SCSI devices.

____ D. Internal hard disks come factory set at SCSI ID number 5; external hard disks come factory set at SCSI ID number 2.

____ E. Internal and external hard disks have a different factory-set SCSI priority numbers.

Module Test

For items 14 through 16, write your answer in the spaces provided.

14. If you are connecting two external Hard Disk SCs, what do you connect the second hard disk to?

   _____

15. A customer has a hard disk that he previously used with an Apple IIGS, but now wants to use the hard disk with a Macintosh SE. After the customer connects the hard disk to the Macintosh, what does he have to do to the hard disk so that the Macintosh can use it? Explain why the customer should do this.

   _____

   _____

16. If a Macintosh system has more than one hard disk containing startup information, what do you use to designate the preferred startup disk?

   _____

Module Test

Compare your answers to those provided on the next page.

Module Test (Answers)

1. A, B,

2. A, B, C,

3. F

4. A, B, C, D, E

5. A, B, C, D, E

6. A, B, C, D, E

7. A, B, C

8. E

9. B

10. B

11. B

12. C

13. A and E

14. Connect the second hard disk to the open SCSI port on the first hard disk.

15. The customer has to reinitialize the hard disk so that it has the format used by the Macintosh computer.

16. Use the Control Panel to select the preferred startup disk.

Reminder: *This written test does not verify that you can perform the hands-on tasks covered in this module. Be sure you can perform all of the tasks listed on the Skills Checklist before attending the Prerequisite Exam and the Lab part of this course.*

Table of Contents

Module Introduction

Overview

The Apple ImageWriter printers are a family of dot-matrix, impact printers. The current ImageWriter product line includes two models: the ImageWriter II and the ImageWriter LQ. This module focuses on the ImageWriter II—its capabilities, set-up procedures, and usage. You will learn how to take apart and troubleshoot the ImageWriter II in a later module.

What You Will Learn

By the end of this module, you should be able to:

- Identify the basic capabilities of the ImageWriter II
- Install the ribbon cartridge and load paper in the ImageWriter II
- Set up the ImageWriter II with a Macintosh computer
- Use the printer

The Skills Checklist following this Module Introduction describes, in detail, the tasks you should be able to perform upon completion of this module.

How You Will Be Tested

The Module Test - This written test is designed to help you verify that you have achieved the skills listed above.

The Prerequisite Exam - Consisting of hands-on and written items, this test will verify that you have mastered the skills listed above. You will then be ready for the Lab part of this course.

Throughout all of the test and exercises, you will be able to refer to these instructional materials and to Apple reference materials.

Prerequisites to the Module

Before you begin this module, you must have completed the following modules:

- Welcome to Apple Service
- Understanding ESD
- Macintosh Basic Features
- Setting Up Macintosh Computers
- Using Macintosh Computers

Module Introduction

Materials Provided for this Module

The Prerequisite provides the following materials for this module:

- This Module Workbook
- Module Test

What You Need to Provide for the Module

You will need to provide the following equipment and materials for this module:

- ImageWriter II printer
- Pin-feed printer paper
- Single-sheet paper
- ImageWriter II Ribbon Cartridge
- Macintosh SE or Macintosh IIcx computer
- An Apple System/Peripheral-8 Cable
- A software application

How Is the Module Organized

This module is presented in three parts.

Part 1 - Basic Features of the ImageWriter II — This part describes the ImageWriter II capabilities and how available accessories extend those capabilities.

Part 2 - Setting Up the ImageWriter II — This part guides you through a series of hands-on exercises. First, you will learn how to install the ribbon cartridge and load paper. Then, you will learn how to connect the ImageWriter II to a Macintosh computer.

Part 3 - Using the ImageWriter II — This part explains the functions of the ImageWriter II and then gives you practice using the printer with a software application of your choice (you can use TeachText, a text editor application included with Macintosh System Software).

Following these three parts is a Module Summary.

Continue with the Skills Checklist on the following pages.

Skills Checklist

What Is the Skills Checklist?

This is a list of tasks that you should be able to perform at the conclusion of this module. The Prerequisite Exam (written and hands-on) will cover these items. During the Lab part of this course, you will be expected to be able to perform all of these tasks.

How to Use the Checklist

Before starting this module, you should check the tasks on this list to see which you can already perform. If you are confident that you can already perform certain tasks, you may decide to skip those parts of the module. Or you may decide to try the Module Test without going through the module.

After completing this module, check this list to make certain that you have mastered all the skills before you attend the Prerequisite Exam and the Lab part of this course. If you feel uncertain about any of these tasks, return to the section indicated, review the information and repeat the hands-on exercises.

Skills Checklist

	Task	Section Where the Task Is Covered
___	1. Identify the basic capabilities of the ImageWriter II.	ImageWriter II Capabilities
___	2. Identify the ImageWriter II accessories available from Apple and explain their functions.	ImageWriter II Capabilities
___	3. Install the ImageWriter ribbon cartridge.	Setting Up the ImageWriter II
___	4. Connect the printer to power.	Setting Up the ImageWriter II
___	5. Load pin-feed and single-sheet paper.	Setting Up the ImageWriter II
___	6. Run the ImageWriter II self-test.	Setting Up the ImageWriter II
___	7. Set up an ImageWriter II printer with a Macintosh computer and test the connection.	Connecting the ImageWriter II to a Macintosh
___	8. Identify the functions of the buttons and lights on the ImageWriter II control panel.	ImageWriter II Control Panel
___	9. Print with the ImageWriter II: – Adjust the first print line on a page – Control the margins – Adjust for paper thickness	Using the ImageWriter II

Continue with the next section - ImageWriter II Capabilities.

ImageWriter II Capabilities

Overview

The ImageWriter II is a dot-matrix printer that can be used with all Macintosh computers. This section will introduce you to its basic capabilities. Knowing what the printer can and cannot do will help you respond to questions presented by ImageWriter II users.

Print Quality and Speed

The ImageWriter II can print text or high-resolution graphics. For text, it produces three levels of print quality:

- Near Letter Quality (NLQ) - Highest quality print produced at 45 characters per second
- Standard Quality - Average quality print produced at 180 characters per second
- Draft Quality - Lowest quality print produced at 250 characters per second

Varied Printing Tasks

The ImageWriter II can perform a variety of printing tasks such as reports, letters, envelopes, mailing labels, and multi-part forms like invoices. It can print on pin-feed or single sheet paper.

Ribbon Cartridges

ImageWriter II ribbons are contained in cartridges that click in and out of the printer. The ribbons are made of continuous-loop fabric and are available in black or color.

Seven-Color Printing

With a color ribbon installed and application software that supports color printing, the printer can produce documents in six colors plus black. Black text can be placed next to color graphics.

ImageWriter II Capabilities

Programmable Features

Through software commands built into application software like MacWrite, the ImageWriter II can print:

- Boldface type
- Underlining
- Subscripts
- Superscripts
- Half-height characters
- Various type sizes
- Several character sets (American plus seven European sets)
- Characters created by the user

The ImageWriter II also provides special formatting features such as horizontal tab settings and spacing options.

Accessories

Apple offers the following accessories for the ImageWriter II:

SheetFeeder

The SheetFeeder allows the user to load up to 100 single sheets of paper, feeds each sheet upon printer demand, and stacks the printouts.

32K Memory Option

The 32K Memory Option is a circuit board that expands the printer memory. This option allows the user to send a document of up to 32,000 characters (16-20 pages) to the printer, freeing up the computer for other work while the ImageWriter II does the printing.

The equivalent of the 32K Memory Option is built-in to Macintosh computers. In most cases, the 32K Memory Option has no effect when used with Macintosh computers.

ImageWriter II Capabilities

LocalTalk Option

LocalTalk is a cable system that connects devices to AppleTalk network systems. By adding a LocalTalk Option, a printed circuit board, to an ImageWriter II and connecting the printer to an AppleTalk network, up to 31 computers can share the printer.

Note: *The ImageWriter II will support either the LocalTalk Option or the Memory Option, but not both.*

Continue with the next section - Exercise: ImageWriter II Capabilities.

Exercise: ImageWriter II Capabilities

Directions

Indicate if the following statements about the ImageWriter II are correct or incorrect by circling TRUE or FALSE.

1. The highest print quality is produced at the lowest printing speed.

   TRUE   FALSE

2. Printing in color requires installing an optional circuit board.

   TRUE   FALSE

3. The 32K Memory Option, together with certain software applications, enables users to continue working while a document is being printed.

   TRUE   FALSE

4. The 32K Memory Option is designed for use with Macintosh computers only.

   TRUE   FALSE

5. With the AppleTalk Option installed in an ImageWriter II, multiple users can share the printer.

   TRUE   FALSE

6. The ImageWriter II can print color graphics and black text on the same page.

   TRUE   FALSE

7. Users can print different character sets by changing a switch setting on the back of the printer.

   TRUE   FALSE

Exercise: ImageWriter II Capabilities

8. To print on single-sheet paper, a user must attach the SheetFeeder accessory.

   TRUE   FALSE

9. Depending on the software application used, the ImageWriter II can produce character sets for languages other than English.

   TRUE   FALSE

10. A user can install either the Memory Option and the AppleTalk Option on an ImageWriter II, but not both accessories.

    TRUE   FALSE

Compare your answers to those provided on the next page.

Exercise: ImageWriter II Capabilities (Answers)

Compare your answers with those given below.

1. True
2. False - An optional circuit card is not needed to print color.
3. True
4. False - The 32K Memory Option card works with Apple II and Macintosh computers. Macintosh computers have the equivalent of a memory option card built-in. Macintosh users generally will not improve performance by using the 32K Memory Option.
5. True - It allows a maximum of 31 users to share an ImageWriter II.
6. True
7. False - This is accomplished through software, not switch settings.
8. False - The ImageWriter can print single pages without an accessory. The SheetFeeder allows users to load up to 100 individual pages.
9. True
10. True

Directions

If you missed more than one of these items, review the section entitled *ImageWriter II Capabilities*.

Otherwise....

Continue with the next section - Setting Up the ImageWriter II.

Setting Up the ImageWriter II

Overview

This exercise covers basic set-up tasks that are the same no matter what type of computer you use with the printer. You will learn how to:

- Unpack the ImageWriter II
- Install a ribbon cartridge
- Connect the printer to power
- Load pin-feed paper
- Run the self-test
- Load single-sheet paper

What You Need For This Exercise

To complete this exercise, you need to provide:

- an ImageWriter II printer and power cord
- an ImageWriter II black ribbon cartridge
- pin-feed printing paper

Unpacking the ImageWriter II

If you have not already done so, unpack the ImageWriter II by following these steps:

1. Remove the ImageWriter II from its carton.

2. Remove all packing materials from the printer and return them to the carton. Save the shipping carton and materials in case you later need to store or ship the printer.

3. Remove all pieces of tape from the printer.

Setting Up the ImageWriter II

4. Take off the front cover by grasping its sides (at the arrow icons) and lifting upward, as shown in Figure 1.
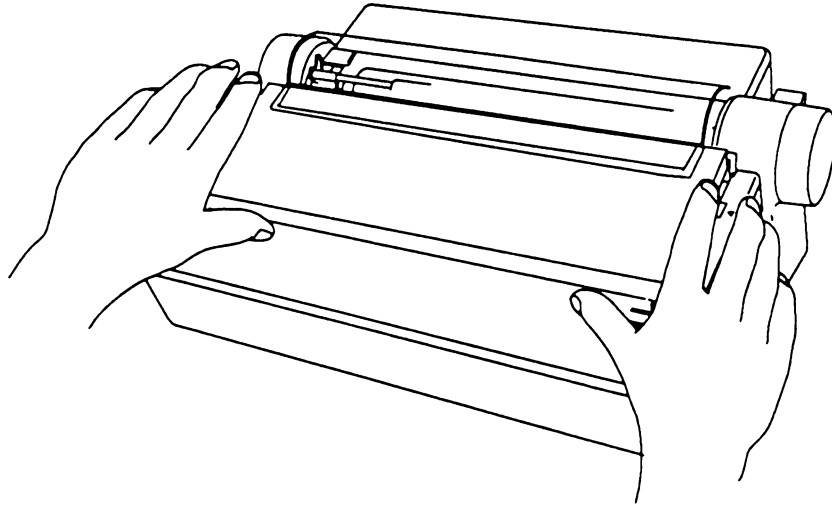
Figure 1. Removing the front cover

5. Remove the cardboard retainer, as shown in Figure 2.

The retainer keeps the print head from sliding around during shipping. Save the retainer with your other packing materials.
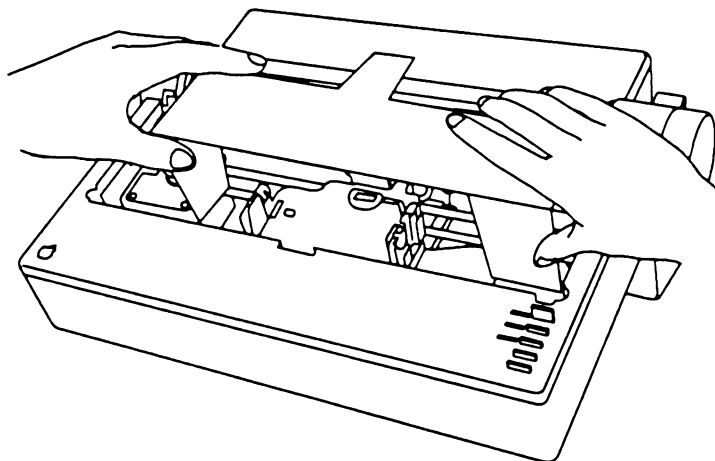
Figure 2. Removing the cardboard retainer

Setting Up the ImageWriter II

Installing the Ribbon Cartridge

The ImageWriter II is shipped with one black ribbon cartridge. Follow the steps below to install it.

1. Locate the **ribbon knob** on the ribbon cartridge and turn the knob clockwise to tighten the ribbon, as shown in Figure 3.
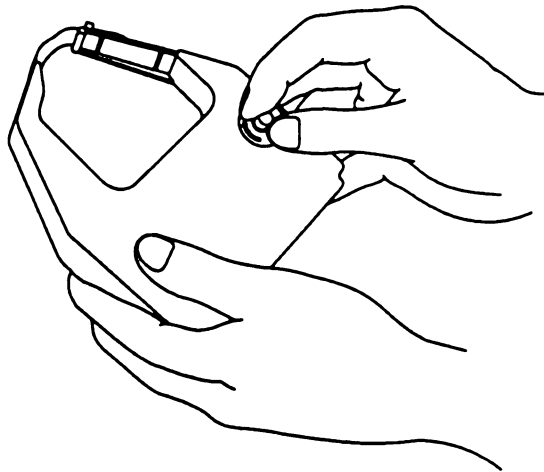
Figure 3. Tightening the ribbon

Setting Up the ImageWriter II

2. If the **ribbon cartridge deck** is off to the side, gently slide it toward the center of the printer, as shown in Figure 4.

   This will give you some working room.
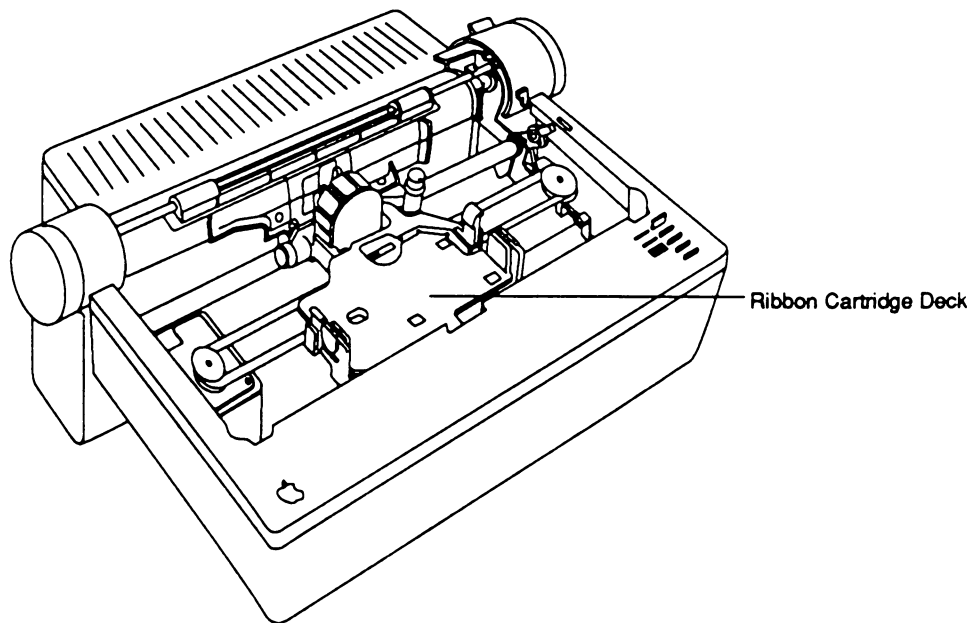
Figure 4. Ribbon cartridge deck

Setting Up the ImageWriter II

3. Lower the ribbon cartridge onto the deck. Make sure that the ribbon slips between the plastic **ribbon guide** and the clear **paper guide**, as shown in Figure 5.

Ribbon Guide
Paper Guide
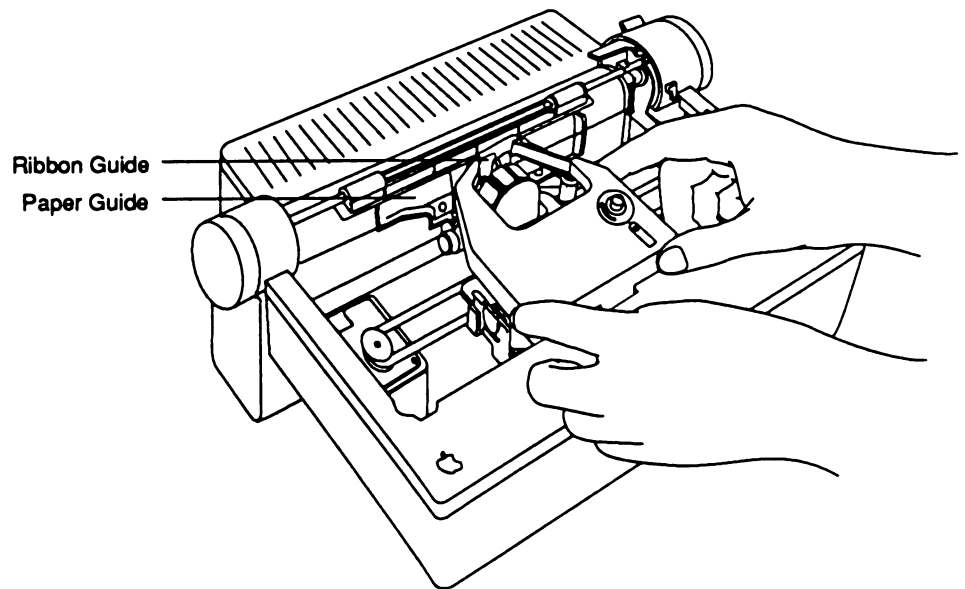
Figure 5. Positioning the ribbon

Setting Up the ImageWriter II

4. When the ribbon is in position, gently press the cartridge between the two **cartridge support tabs**, so that the ribbon snaps into place (see Figure 6). Make sure the ribbon is still positioned between the ribbon and paper guides.

Support tabs

Support tabs
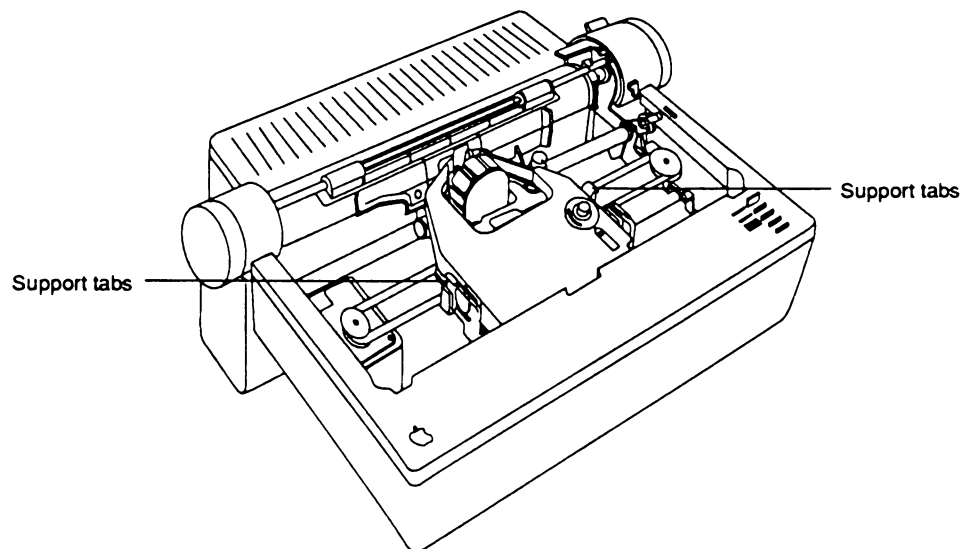
Figure 6. Properly seated ribbon

5. Take any slack out of the ribbon by turning the ribbon knob clockwise.

6. Replace the front cover on the printer by slipping the cover tabs into the receiving slots and pressing down on the cover.

Note: *If you do not replace the front cover correctly, the printer will not function. However, you can run the printer if the front cover window is tilted open or removed*

Removing Ribbon Cartridges

To remove a ribbon, gently spread the support tabs and lift the cartridge out. (You do not need to remove the ribbon cartridge now.)

Setting Up the ImageWriter II

Turning On the ImageWriter II

To turn on the printer, perform the following steps.

1. Plug the power cord into the power socket of the ImageWriter II.

   The power socket is on the back of the ImageWriter II, as shown in Figure 7.
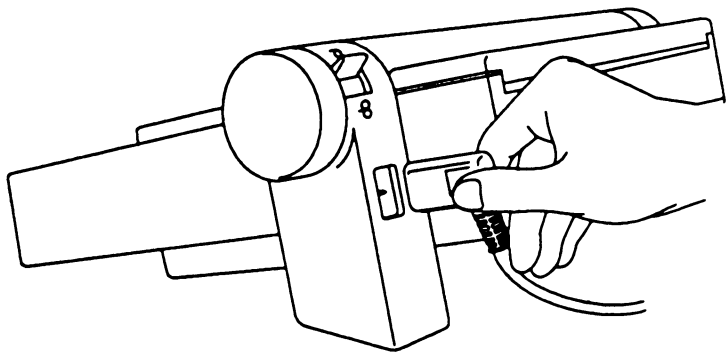
Figure 7. Power socket on the ImageWriter II

Setting Up the ImageWriter II

2. Plug the three-pronged end of the power cord into the power outlet.

3. Press the **On/Off switch**, shown in Figure 8.

   As you turn on the printer, note these indications:

   - The green **Power light** and red **Error light** will light up. The Error light is on because the printer is out of paper.

   - The print head moves to the left margin and then to the center. The ImageWriter II moves the print head to the center when no paper is present.
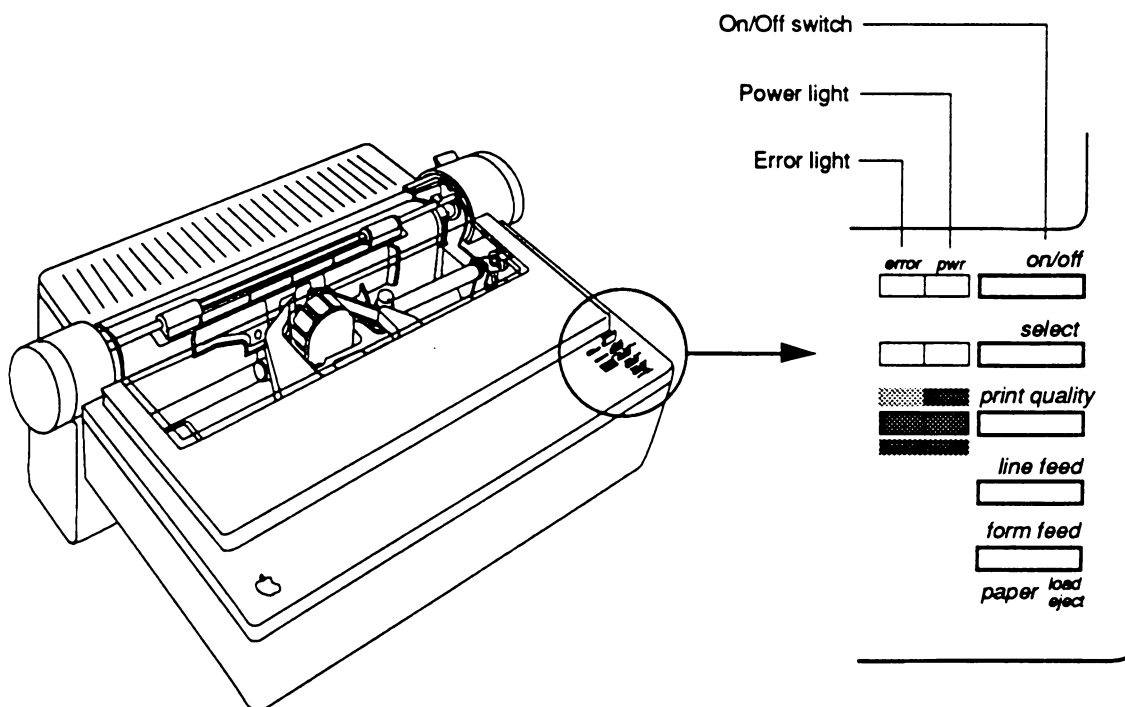
Figure 8. The On/Off switch and related lights

If nothing happens, check the following:

- Is the front cover in place?
- Press the On/Off switch again. Is the printer on now?
- Check the power cord connections. Is everything firmly plugged in?
- Has anything interrupted power to the wall socket or power strip?

Setting Up the ImageWriter II

If all the connections and the external power source are OK and the ImageWriter II still does not power on, the unit may be damaged. Get another ImageWriter II to work with.

Positioning Pin-Feed Paper

Before loading the pin-feed paper, position the stack of paper so that the paper flows easily into the printer. For best results, place the stack of paper behind the printer. Make sure the power cord does not lay across the paper path and cause the paper to jam as it enters the printer.

Warning: *Keep the paper path both into and out of the printer free of obstruction. Place the printer so that printed pages fall away from the printer. Piled-up pages can cause printer jams or unevenly printed lines.*

Loading Pin-Feed Paper

The vertical sides of pin-feed paper have holes punched through them and there are perforations between sheets.

The first time pin-feed paper is loaded into a unit, you need to do the following three things: (For now, just *read* these steps.)

• Adjust the tractors to accommodate your paper width
• Set the printer to pin feed instead of friction feed
• Roll the paper in

Now, follow these steps to load paper into your printer:

1. Check the first sheet (the lead sheet) of the pin-feed paper. If it is torn, wrinkled, or otherwise flawed, tear it off at the next perforation to present a clean edge to the printer.

Setting Up the ImageWriter II

2. Lift up and remove the **back cover** to get to the tractor, the device that pulls paper into the printer. Set the cover aside. (See Figure 9.)
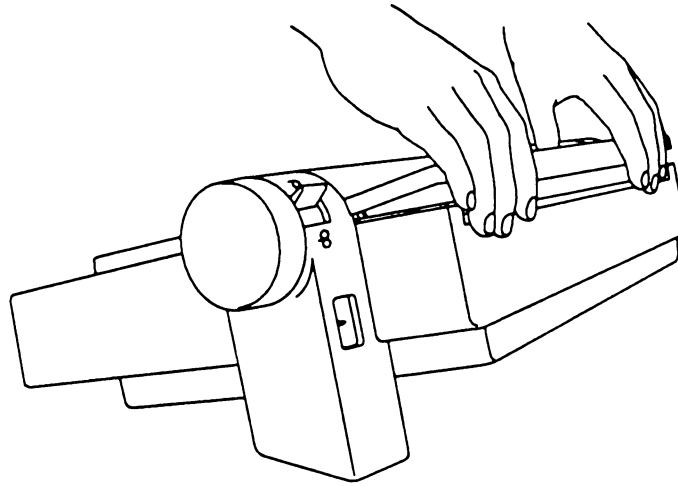
Figure 9. Removing the back cover

Setting Up the ImageWriter II

3. Flip open both **paper clamps** by lifting them in an outward direction. The clamps will spring into an upright position. (See Figure 10).
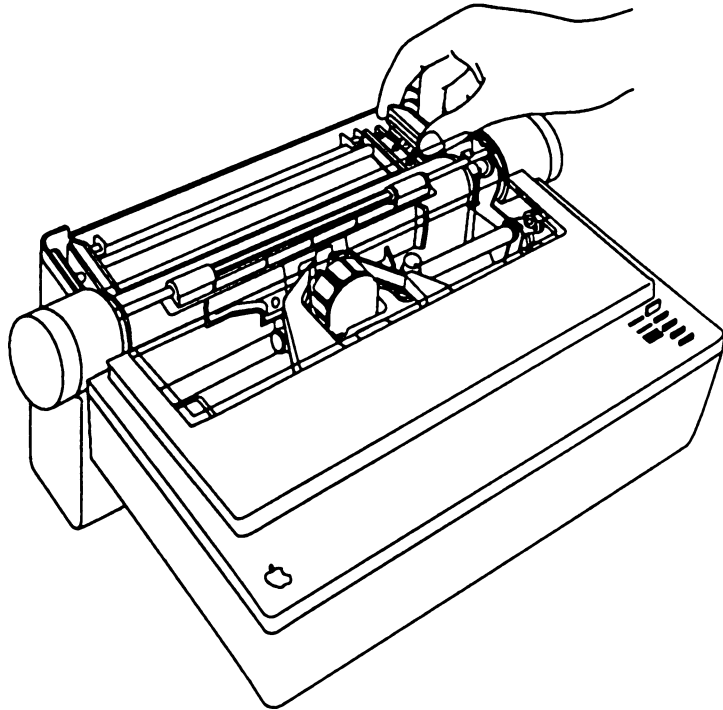
Figure 10. Opening a paper clamp

Setting Up the ImageWriter II

4. Flip the two **tractor release levers** into the up position by pushing them toward the front of the printer.

    This frees the tractors so you can adjust them to the width of your paper. Figure 11 illustrates the right tractor release lever position.

Tractor release lever ————
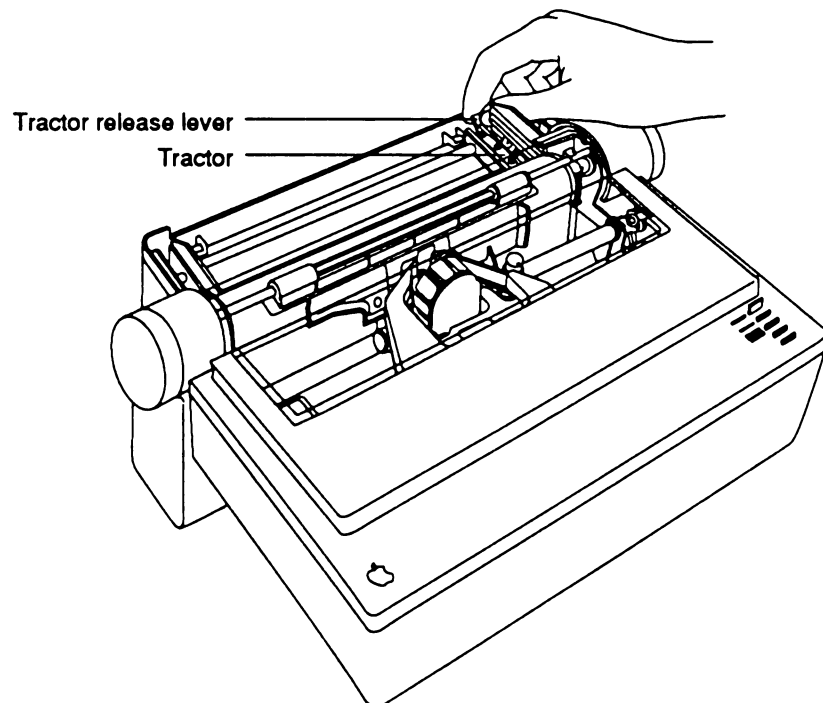
Tractor ————

Figure 11. Releasing the right tractor

The tractor is the device that pulls the paper into the printer.

Setting Up the ImageWriter II

5. Lay down the lead sheet of paper so that the first three pins on the left-margin tractor poke through the first three pin holes on the left side of the paper, as shown in Figure 12. Do not worry about the other side of the paper for the moment.
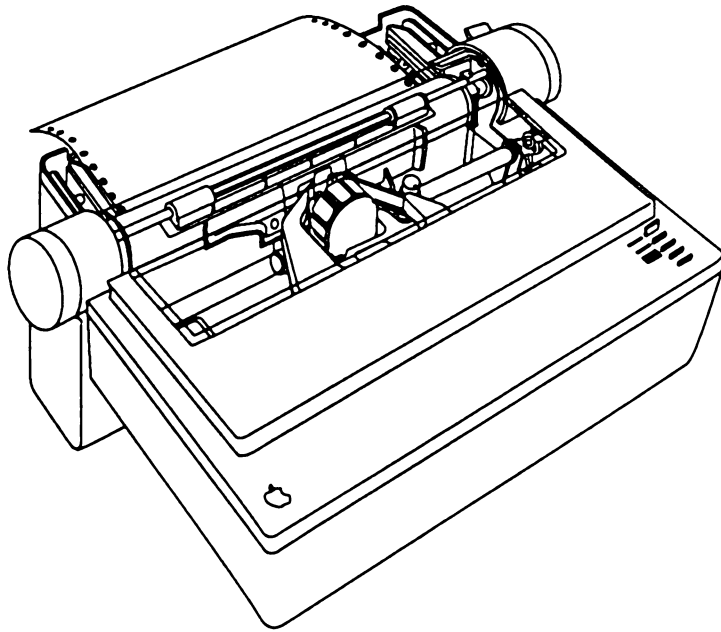
Figure 12. Loading pin-feed paper

6. Close the left-margin paper clamp over the paper.

Setting Up the ImageWriter II

7. Find the **pin-feed alignment icon** on the back panel of the printer and the **alignment notch** directly above it. (See Figure 13.) Slide the tractor until the paper edge (not the perforation) is lined up with the notch and the vertical line on the icon.

   With the paper properly aligned, printing will begin 1/4 inch from the perforation.

Alignment notch
Pin-feed alignment icon
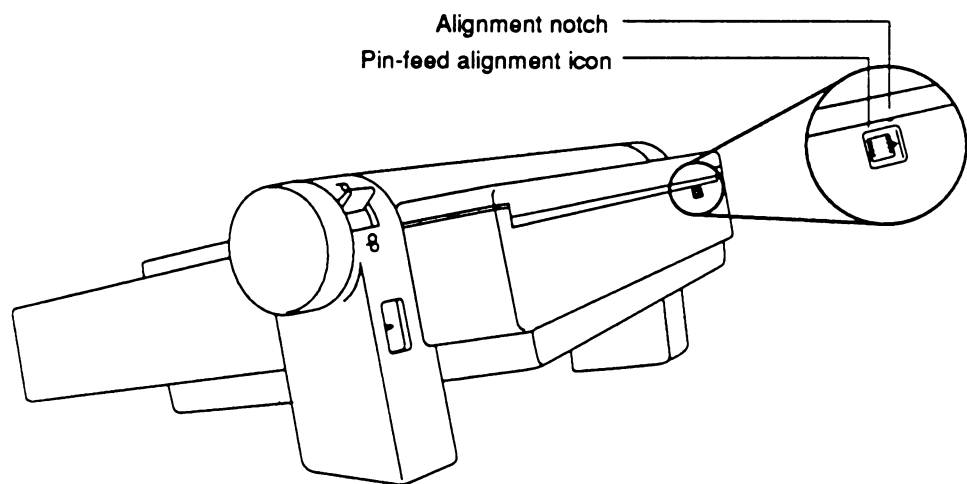
Figure 13. The pin-feed alignment icon

8. With the tractor and paper properly aligned, lock the left-margin tractor in place by pressing the tractor release lever into the down position.

9. Slide the other (right-margin) tractor so that its top three pins come up through the first three holes in the paper.

10. Close the paper clamp and gently slide the right-margin tractor as far as necessary to take the slack out of the paper.

IMAGEWRITER II

Setting Up the ImageWriter II

11. Press the right-margin tractor release lever into the down position. Figure 14 shows a properly aligned sheet of pin-feed paper.
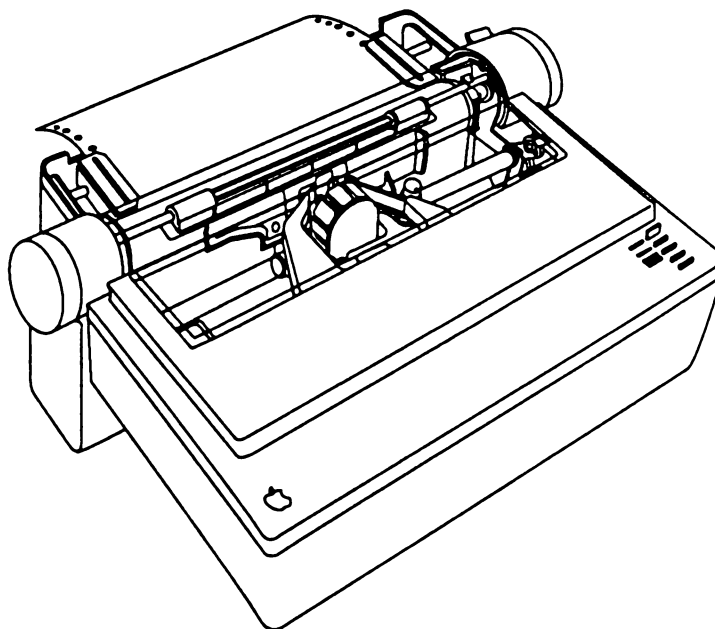
Figure 14. Properly aligned pin-feed paper

Once the tractors are properly positioned, all you need to do to add paper later is open the paper clamps, drop the paper onto the pins, and close the clamps. You will not need to readjust the tractor positions unless you use paper with a different width.

Setting Up the ImageWriter II

12. Set the **paper-feed selector**, located next to the **platen knob** to the up position for pin feed, as shown in Figure 15.

Pin-feed icon ——

Paper-feed selector ——
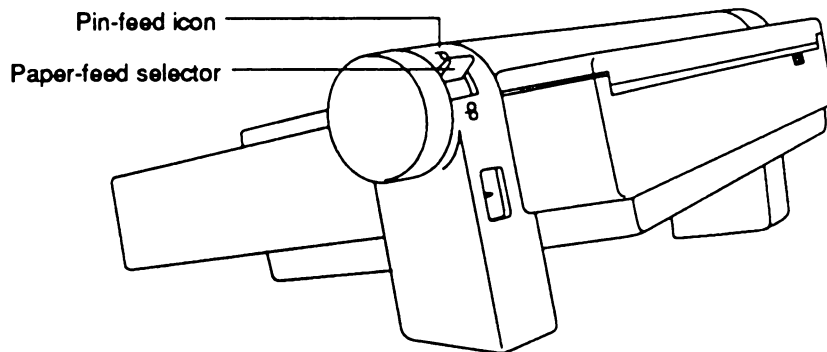
Figure 15. Paper feed selector set for pin feed

13. To load the paper into the printer, turn the platen knob clockwise until the leading edge of the paper is between the platen and the paper bail, as shown in Figure 16.

Setting the top edge of the paper under the paper bail positions the paper so that you can tear off the last printed sheet without wasting a page.

Paper bail ——
Paper ——
Platen ——
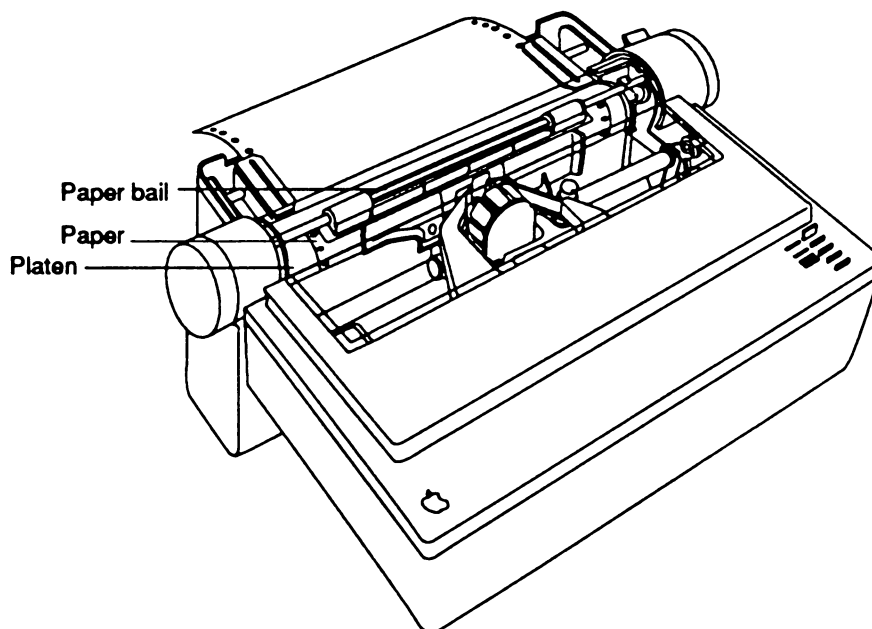
Figure 16. Paper loaded under the paper bail

Setting Up the ImageWriter II

14. Replace the back cover.

With the top edge of the paper under the paper bail, printing will begin approximately one inch from the top of the paper.

If you print from a Macintosh, the paper will usually roll back about 3/8 inch before printing begins.

Most applications let you set additional margins. The margin you set in an application is added to the margin you set by placing the paper under the paper bail. Later you will learn tips for resetting software top margins.

Running the Self-Test

Whenever you set up an ImageWriter II, you should run the self-test, a software routine built into the ImageWriter ROM. The self-test will print the ImageWriter II character set repeatedly until the unit is powered off. If the color ribbon is installed the test will print all the colors the ImageWriter II can generate.

If the unit passes this test, you can assume that the printer is functioning properly. Then, if you have printing problems after you connect the printer to a computer, you can assume that the failure lies outside the printer—for example, in the computer, in the software, or in the connection between the computer and printer.

Now that you have correctly loaded paper into the ImageWriter II, follow these steps to run the self-test.

Warning: *Never print when the ribbon and paper are not in place. Repeated printing on a bare platen can damage the platen and the printing element.*

Setting Up the ImageWriter II

1. If the ImageWriter II is on, turn it off by pressing the On/Off switch.

2. To start the self-test, press the **Form Feed button** (shown in Figure 17) and hold it down while you press the On/Off switch. Release both buttons simultaneously.

As soon as the print head moves to the left margin, the printer will begin printing.
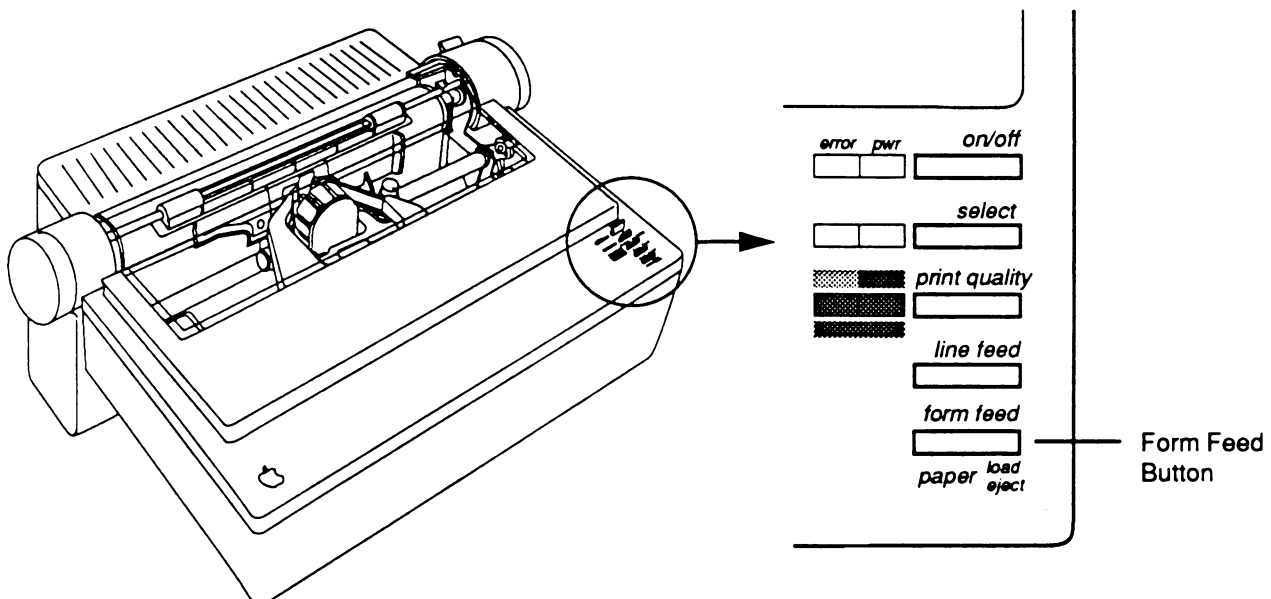
Figure 17. Form Feed button

3. To stop the self-test, press the On/Off switch to turn the printer off.

4. Roll the paper forward to position the perforation under the paper bail.

   This ensures that when you turn the printer back on, printing will begin an inch from the top.

5. Tear off the test sheet.

Setting Up the ImageWriter II

Checking the Self-Test Printout

The self-test produces a printout similar to the one shown in Figure 18.

```
SELF TEST

ROMREV(05)

DIPSW1(00000100)  DIPSW2(1100),'1=ON,0=OFF'

RAM= 0 KB  AT=OFF

!"#$%'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
!"#$%'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
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56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%'()*+
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%'()*+,
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LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ !"#$%'()*+,-./0123456789:;<=>?@AB
```

Figure 18. A printout produced by the ImageWriter II self-test

Setting Up the ImageWriter II

Examine the printout carefully:

- Are all characters complete?
- Are all characters well aligned?
- Is the spacing between characters and lines even?
- Are all lines equally dark from beginning to end? from left to right?

If you notice any problems, check the following list to see if the ribbon is properly installed and the paper correctly loaded.

- Is the ribbon cartridge firmly seated in its carrier?
- Does the printing area of the ribbon lie between the ribbon guide and the paper guide?
- Is the ribbon loose?
- Is the paper straight?

Setting Up the ImageWriter II

Loading Single Sheets of Paper

You can load single sheets of paper in two ways. You can take advantage of the ImageWriter's automatic paper-loading feature or you can crank the paper by hand with the platen knob.

To use the automatic paper-loading feature, follow these steps:

1. Turn on the printer.

2. Set the paper feed selector to the down position for friction feed, as shown in Figure 19. Choosing friction feed turns off the pin-feed mechanism.

Paper feed selector
Friction-feed icon
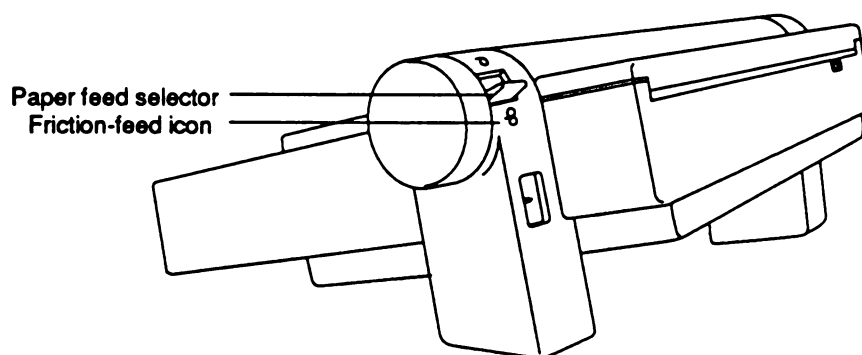
Figure 19. Paper feed selector set for friction feed

3. Slip the sheet of paper between the back cover and the platen.

4. Find the single-sheet icon on the left side of the back cover and line up the paper with the vertical line on the icon, as shown in Figure 20.

Setting Up the ImageWriter II

Single sheet alignment icon
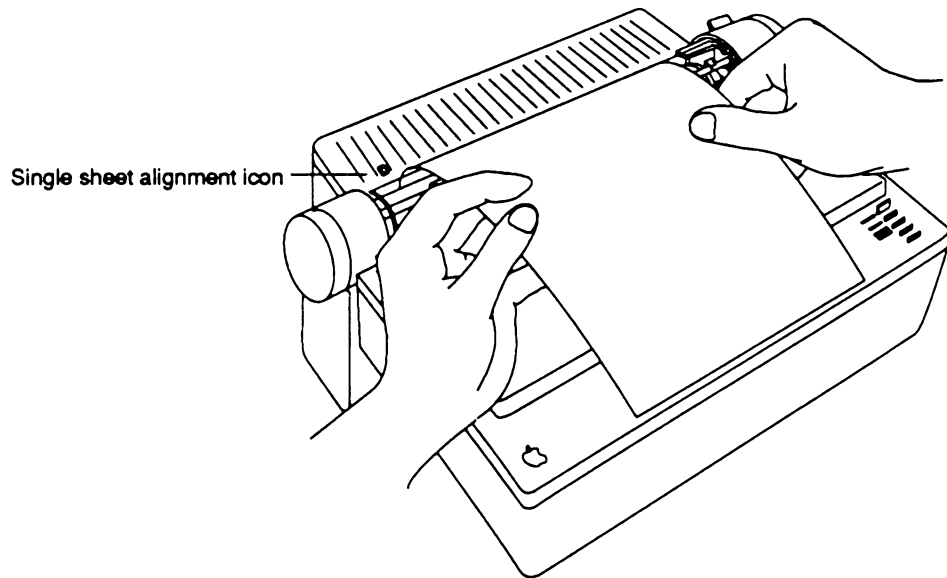
Figure 20. Aligning a single sheet of paper

6. Press the Form Feed button to load the page automatically.

   The ImageWriter II rolls the paper and positions it for printing on the first line of the page (indicated by the print line on the plastic paper guide, as shown in Figure 21).
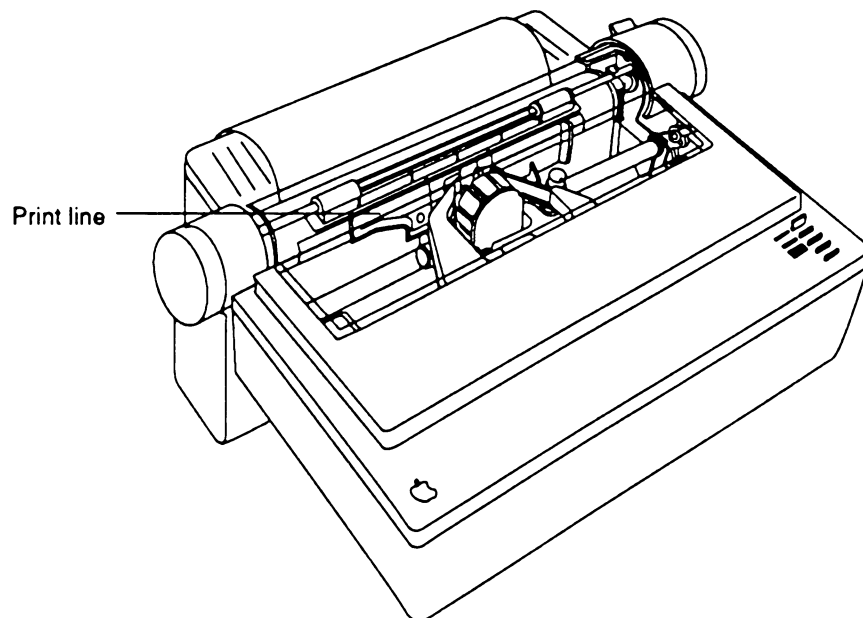
Print line

Figure 21. Print line

Setting Up the ImageWriter II

If the paper does not load, check that the **Select light** is off. If the Select light is on, press the **Select button** and then the Form feed button. (See Figure 22.)
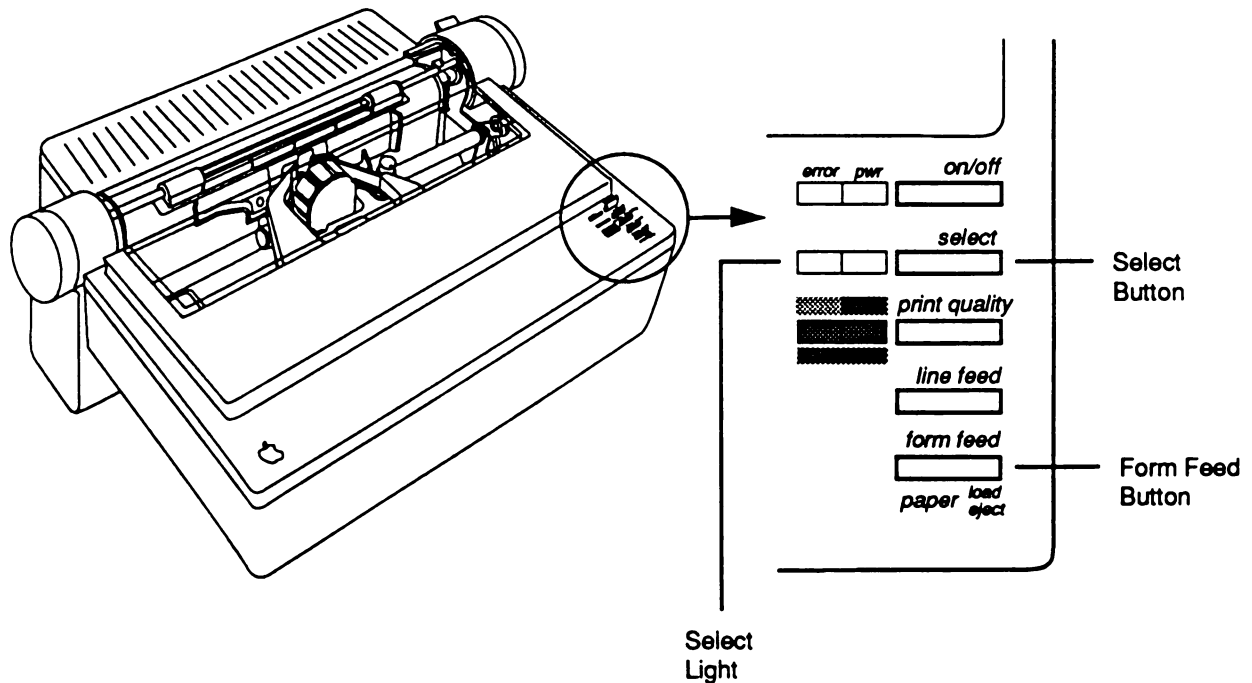
Figure 22. Select light, select button and Form feed button

If the Error light did not go out after you loaded the paper, the paper probably didn't roll far enough into the printer. Turn the platen knob clockwise until the Error light goes out.

Continue with the next section - Connecting the ImageWriter II to a Macintosh.

Connecting the ImageWriter II to a Macintosh

Overview

In this exercise, you will connect an ImageWriter II to a Macintosh computer. You learned about the Macintosh SE and the Macintosh IICX in previous modules, so select one of them for this exercise. However, if you have experience working with a Macintosh Plus, you may decide to use it. The directions are the same for connecting the ImageWriter to all Macintosh computers.

What You Need for This Exercise

To complete this exercise, you need the following:

- an ImageWriter II with the ribbon cartridge installed, paper loaded, and self-test completed successfully
- a Macintosh computer
- an Apple System/Peripheral-8 Cable

Overview of the Connection Process

Connecting the ImageWriter II to a Macintosh involves the four steps listed below. **For now, just read the steps.** In a few minutes, you will be given more details about each step and will perform them as you connect your printer to your Macintosh.

1. Check to make sure the System Folder on your Macintosh startup disk contains the correct ImageWriter II printer resource (also called printer driver).

2. Plug the printer cable into the printer and the Macintosh.

3. Select the ImageWriter II driver in the Chooser desk accessory.

4. Test the connection between the printer and the computer.

Connecting the ImageWriter II to a Macintosh

**Checking the
Resource File**

To use the ImageWriter II with a Macintosh computer, you must have an ImageWriter printer resource (driver) in the System Folder on any disk that you use as a startup disk. Printer drivers allow the computer to communicate to specific types of printers.

• Check the System Folder on your startup disk to see if it contains a printer driver file named *ImageWriter*. Figure 23 illustrates the icon for this resource.

ImageWriter

Figure 23. Icon for the ImageWriter II printer resource

If the ImageWriter printer driver is in the System Folder, you have the driver software you need. If it is not, you need to copy it from a current *Macintosh System Software* disk.

Connecting the ImageWriter II
to a Macintosh

Connecting the Printer to the Macintosh

Once you have the correct printer driver installed, you can connect the System/Peripheral-8 cable to the printer and to the Macintosh computer. Follow the steps below:

Warning: *Always make sure you have turned off both the computer and the printer, before connecting or disconnecting them. Changing cables when the power is on can damage your equipment.*

1. Plug one end of the printer cable (both ends are the same) into the ImageWriter II serial interface socket, as shown in Figure 24.
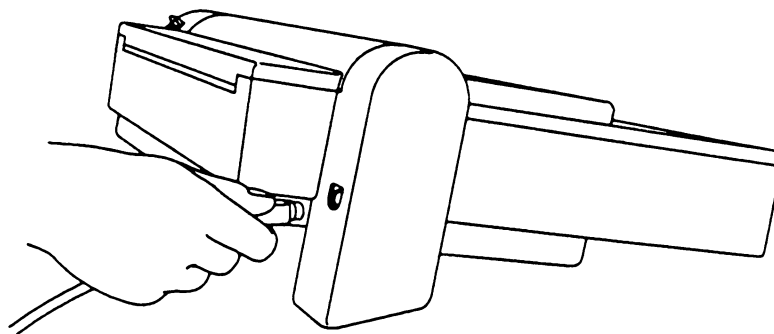
Figure 24. Plugging the printer cable into the printer

Connecting the ImageWriter II
to a Macintosh

2. Hold the free end of the cable with the Apple logo facing up.

3. Plug the connector into the Macintosh printer port, as shown in Figure 25. If you the printer port is already being used for another connector, you can plug the printer cable into the modem port.
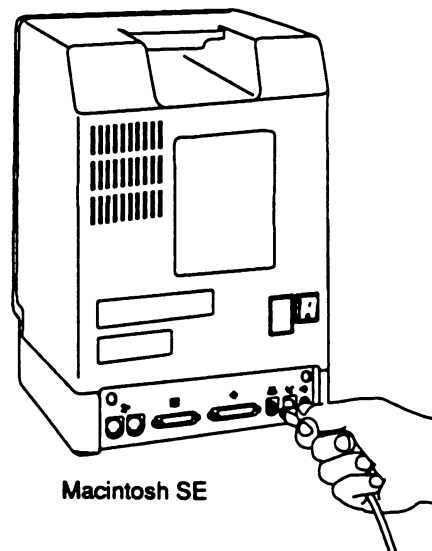
Macintosh SE

Figure 25. Connecting the printer cable to the Macintosh printer port

Selecting the ImageWriter II In the Chooser

Now you are ready to use the Chooser desk accessory to select the ImageWriter printer resource (or driver) for the ImageWriter II—and to indicate which port you used to connect the printer. Follow these steps:

1. Make sure you have a startup disk in a drive and turn on the Macintosh. You can also boot from a hard disk if you have one.

Connecting the ImageWriter II to a Macintosh

3. Turn on the printer.

4. Select Chooser from the Apple menu.

   If the Chooser is not present under the Apple menu, use another startup disk.

5. Select the ImageWriter icon as shown in Figure 26.
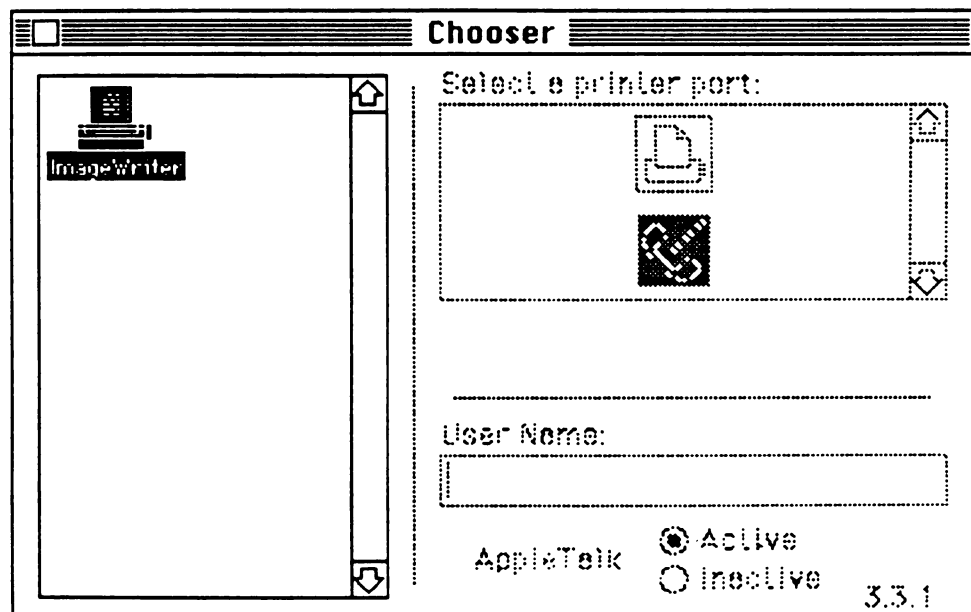
Figure 26. Choosing the ImageWriter icon

Connecting the ImageWriter II
to a Macintosh

6 If you have connected the ImageWriter II to the printer port, choose the printer port icon as shown in Figure 27. If you have connected the ImageWriter II to the modem port, choose the modem port icon.
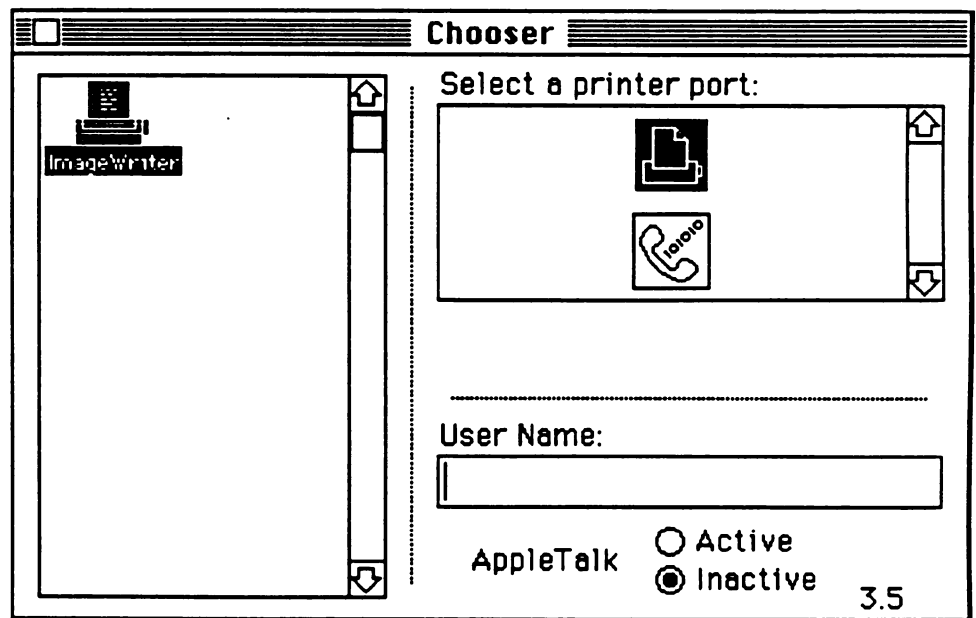
Figure 27. Choosing the printer port icon

7. Click the close box. The selections are saved when you close the Chooser.

Note: *The User Name box in the Chooser is used to register the users name only when the ImageWriter is used on an AppleTalk network.*

Connecting the ImageWriter II to a Macintosh

Testing the Macintosh Connection

After connecting the ImageWriter II to a Macintosh, you should test the connection to verify that the computer can send data to the printer and that the printer can print the data.

Follow these steps to test the connections:

1. Press the Caps Lock key into its down position.

2. Hold down the Command and Shift keys while you press 4.

The ImageWriter II will start printing the contents of the current Macintosh screen.

If it does not,

1. Check to make sure that both ends of the printer cable fit firmly into their ports.

2. Open the Chooser and make sure that you have selected the ImageWriter icon and the icon for the correct port—either the printer or the modem port.

3. Make sure AppleTalk is set to inactive. Then go back and try the test again.

Continue with the next section - ImageWriter II Control Panel.

ImageWriter II Control Panel

Overview

This section describes the various buttons and lights on the ImageWriter II control panel.

Figure 28 shows the buttons and lights on the ImageWriter II control panel.
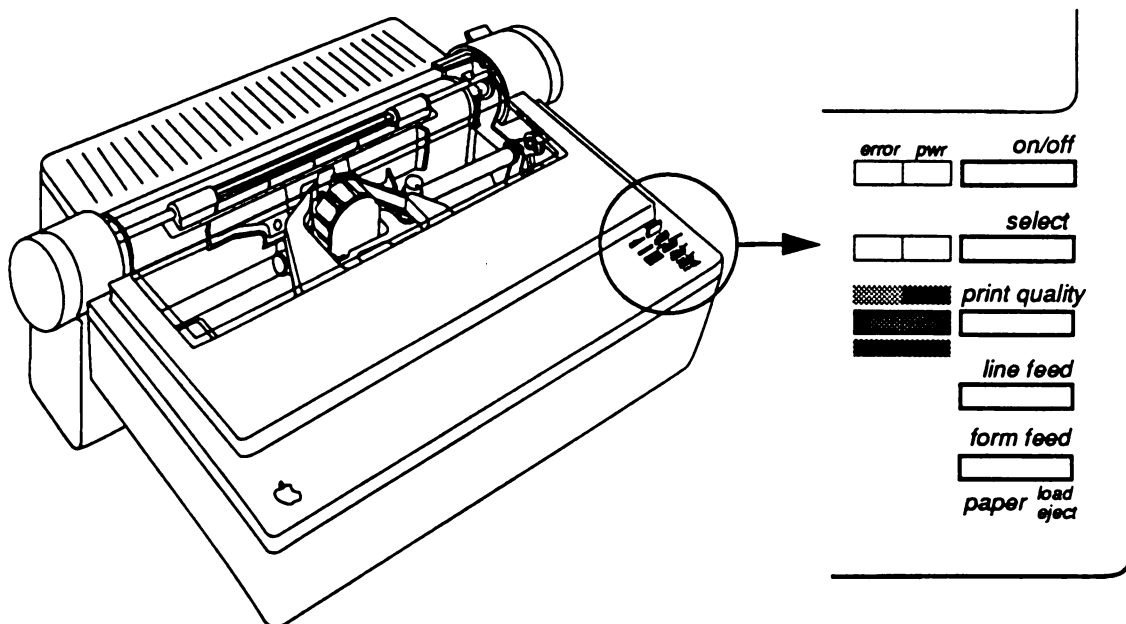
Figure 28. The ImageWriter II control panel

The On/Off Switch and Power Light

Pressing the On/Off switch turns the printer on and off. When the printer is on, the green Power light is on. When you turn the printer off, the Power light fades out.

ImageWriter II Control Panel

The Error Light

The Error light can light in three ways: continuously on, blinking, or irregular blinking. Each state indicates a different problem area.

- **Continuously on**— The ImageWriter II has run out of paper. Load the appropriate paper and press the Select button to continue printing.

- **Blinking on and off**— Look for either of two causes. The front cover may be loose or off. Correctly seat it and press the Select button to continue. If the front cover is not the cause, check to see if the paper has jammed.

- **Blinking irregularly** — Check DIP switch SW2-4, located toward the front-left corner of the printer. (You may have to slide the ribbon cartridge to the right to see the DIP switches.) If you do not have an option card (for either the ImageWriter II 32K Memory Option or LocalTalk Option), the switch should be set to open. If you have either of these options installed, the switch should be closed.

The Select Button and Light

When you press the Select button, the Select light turns on or off. The Select button places the computer in one of two modes.

When the Select light is **on**, the printer is in print mode. In this mode, the printer can receive and print data sent from the computer. Pressing the Select button is referred to as "selecting the printer." When the printer is in the "select" mode, the Control Panel buttons, except for the On/Off switch, are disabled.

When the Select light is **out**, the printer is in select mode. In this mode, the control panel is enabled and you can set print quality or issue a form feed. In this mode, the printer can't receive print data.

When you start the ImageWriter II with paper loaded, the Select light comes on automatically. When you run out of paper, the Error light comes on and the Select light goes out. This means that the printer is no longer selected. The computer stops sending data and the printer stops printing. After you add more paper, you can resume printing by pressing the Select button. Printing continues without losing any text.

When the Select light goes out because you have run out of paper, you can print several more lines onto a page by pressing the Select button. Each time you press the Select button, one line will print. Be careful not to print on the bare platen.

ImageWriter II Control Panel

The Print Quality Button and Light

The Print Quality button allows you to select from among the three levels of print quality. Make sure the Select light is off before choosing a print quality. (If the light is on, press the Select button.)

By pressing the Print Quality button repeatedly, you can "walk" through the three settings. The Print Quality lights indicates which level is selected, as shown in Figure 29. When only the left light is on, you get draft quality. When the right light is on, quality is standard. Both lights on means near letter quality.

Standard quality (right side only)

Draft quality (left side only)

Print quality light

Near letter quality (both sides)

error pwr   on/off

select

print quality

Keep pressing this button until the light matches the print quality level you want.

line feed

form feed

paper load eject
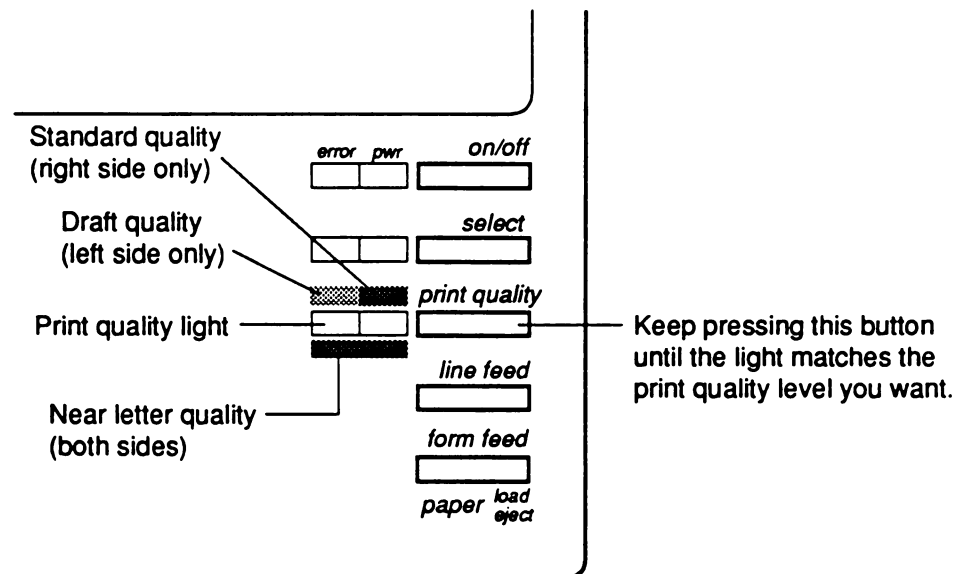
Figure 29. Print Quality selection lights

ImageWriter II Control Panel

Important Note: *Choosing either Faster or Best quality in the Macintosh Print command dialog box overrides any quality setting on the printer. However, if you choose Draft quality in the dialog box, the quality will be that currently selected at the printer—either draft, standard, or NLQ.*

The Line Feed Button

If you press and release the Line Feed button, the paper advances one line.

If you press and hold down the Line Feed button, the printer will advance the paper four lines.

After the fourth line feed, the printer automatically performs a form feed (explained below).

If the Select light is on, pressing the Form Feed button has no effect.

The Form Feed Button

The Form Feed button has three related functions:

- **Form Feed** — when using pin-feed paper, pressing the Form Feed button advances the paper one full page-length.

- **Paper Load—** when loading a single sheet of paper, pressing the Form Feed button causes the printer to load the sheet so that the print head is 1/6 inch below the top edge of the paper. Printing begins from this position (unless you have set margins in your software, in which case, the margins are measured from this position).

  Macintosh users printing on single sheets of paper should be sure to select Hand Feed in the Print dialog box.

- **Paper Eject—** when a print job finishes in mid-page, pressing the Form Feed button ejects or pushes out the current page. If you are using pin-feed paper, the printer advances the paper to the top of the next page.

When the Select light is on, pressing the Form Feed button has no effect.

Continue with the next section - Using the ImageWriter II.

Using the ImageWriter II

Overview

In this exercise, you will practice using the basic features of the ImageWriter II printer. This practice will focus on two things that can cause users difficulty:

- adjusting the first print line
- controlling margins

In the first part of this exercise, you will learn how to adjust where the printer prints the first line on a page. Then, you will be guided step-by-step through an exercise to learn first-hand about adjusting the top of the page.

In the second part, you will learn how to set margins. For hands-on practice, you will need to use a software application with the ImageWriter II.

The last part presents a few miscellaneous points about about using the ImageWriter II.

What Do You Need

To complete the exercises, you will need:

- an ImageWriter II connected to a Macintosh computer
- pin-feed paper loaded in the ImageWriter II
- a software application (you can use TeachText, a text editor application included with Macintosh System Software)

Using the ImageWriter II

Controlling Where the Top Line Prints

When you turn on the printer, the ImageWriter II assumes that the paper is positioned with the top edge just under the paper bail. As long as you leave the printer turned on, the printer remembers this position as the top of a page.

This means that when you press the Form Feed button, or when an application issues a form feed (when it reaches the bottom of a page during a print job), the ImageWriter II knows how far it must advance the paper to begin printing on the top of the next page.

If you advance the paper or load paper independently of the software, you can cause the ImageWriter II to misjudge the position of the page breaks. For example, if you interrupt a print job and then advance the paper (either manually or by pressing the Line Feed button), the software **will not register that you have set a new paper position**. The result is that the next page break will occur somewhere in the middle of the page instead of at the end of a page.

You can easily tell the printer where the perforations between pages are by following these steps:

1. Press the On/Off switch to turn off the printer.

2. Turn the platen knob to advance the paper to the top of first page.

3. Press the On/Off switch again to restart the printer.

Using the ImageWriter II

Hands-on Exercise

To practice setting the top of the page and to check the print quality levels, follow these steps.

1. Open the text editor application of your choice on the Macintosh you are using. Type a few text lines.

2. Turn on the ImageWriter II.

   If the printer was loaded with paper when you turned it on, the Select light will be on. This indicates that the printer is ready to receive and print data sent from the computer.

3. Note where the top edge of the paper is in relation to the paper bail.

4. Press the Select button to turn off the Select light so that you can use the control panel.

Note: *You can use the Quality, Line Feed, or Form Feed buttons only if the Select light is off.*

5. Select draft quality printing by pressing the Print Quality button repeatedly until only the left light is on, indicating that draft quality is selected.

6. Press the Select button to enable Print mode. The Select light comes on again.

7. Print the lines you just entered in the text editor application (remember to set the print quality to Draft in the print dialog box).

8. When the printer finishes printing the lines, press the Select button again to enable the printer control panel.

9. Press the Form Feed button to advance the paper one full page-length. Note that the paper is positioned with the top edge just as it was when you loaded the paper.

10. Now press the Print Quality button to select standard quality, indicated by the right light.

11. Press the Select button again.

Using the ImageWriter II

12. Print the data again.

13. When the printing stops, press the Select button to deselect the printer.

14. Turn the platen knob to advance the paper to the middle of the page.

15. Now press the Print Quality button to select Near Letter Quality. Both lights come on to indicate this high density printing.

16. Press the Select button again.

17. Give the software command on your computer to print the data again.

18. When the printing stops, press the Select button again.

19. Press Form Feed to advance the paper to the next page. Note where the top edge of the paper is. The software now recognizes the middle of the page as the "top of the page" because you manually advanced the paper in Step 14.

20. To reset the top of the page, press the On/Off switch to turn off the printer.

21. Turn the platen knob to advance the paper to the top of next page.

22. Turn the printer on again.

    The printer now registers the new position (wherever you repositioned the paper) as the "top of the page."

23. Enter a few lines on the computer and issue the print command.

24. When the printing stops, press the Select button.

25. Press the Form Feed button to advance the page.

    Note that the printer advances the paper to the new "top of the page"—wherever the paper was positioned when you restarted the printer.

26. Tear off the pages you printed. Compare the three levels of print quality.

Using the ImageWriter II

Controlling Margins

The way you set margins varies depending on the application you're using. You can usually set top, bottom, left, and right margins within the application you are using.

Top and Bottom Margins

When setting a top margin, remember that the top margin you specify will be measured from the place the printer has registered as the top of the page. In general, if you turn on the printer with one inch of paper extending above the print line and then set a one-inch top margin in your application, the result will be a total of two inches of blank space above the first printed line.

If you are printing from a Macintosh, however, pin-feed paper will usually roll back about 3/8 inch before printing begins, making your top margin only 5/8 inch. You can use your application software to compensate for this roll back. Some applications allow you to add carriage returns or headers to the tops of pages. Others let you specify a top margin in the Page Setup dialog box (usually found in the File menu).

Note: *Because applications differ in how they determine where printing begins on a page, the best way to set margins is to try printing a test page with an application before you print a document. For example if you're using a word processing program, type a line of text across the top of the page, print the page, and notice where the line prints. Then adjust your software to achieve the margins you want. You can do the same kind of trial run by drawing a horizontal line across the top of the page in a graphics program.*

When you set a bottom margin, remember to take into account that one inch more paper above the print head means 1 inch less paper below the last line of text. For example, if you want a two-inch bottom margin, and you turn on the printer with 1 inch of paper above the print line, you need to set your software for a three-inch bottom margin to compensate for the extra inch on the top of the page.

Left and Right Margins

When working with pin-feed forms and labels, you may need to adjust the left margin to start printing at the left edge of the paper. Usually the application software you are using allows you to adjust these margins (see the documentation for the application). If it does not, simply try printing a sample form or label to determine where your software begins printing. Then slide the left tractor over so that the form is in the proper position for left-margin printing. Set the right tractor to take up the slack in the form or labels.

Using the ImageWriter II

Important: *Do not try to set the margins beyond the red rings on the paper bail. These rings represent the print head's absolute boundaries. (See Figure 30.)*
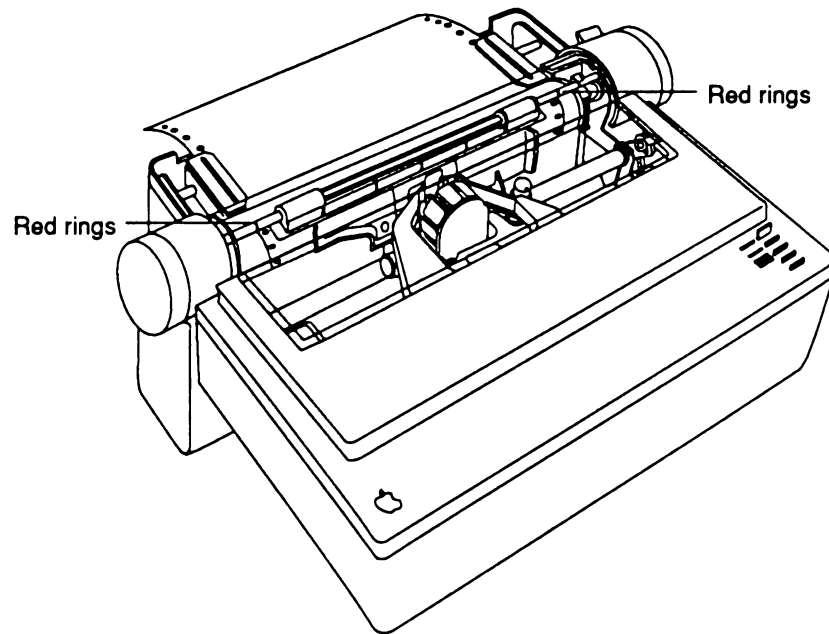
Red rings

Red rings

Figure 30. Red rings on the paper bail

Optional Exercise

If you have learned how to use any software applications, you may want to use one now to explore how it treats margins. Does it allow you to set the top and bottom margins? If so, try it out.

Does it allow you to set the right and left margins? If so, try to set them. Then, print something to check the settings.

Using the ImageWriter II

**Adjusting for Paper
Thickness**

The ImageWriter II has a paper thickness lever that you should adjust when printing on multipart forms or envelopes. The paper thickness lever, shown in Figure 31, clicks through four positions. In its standard up position, the lever sets a thickness for one sheet of paper (for 16 to 24-pound paper).

Paper thickness lever
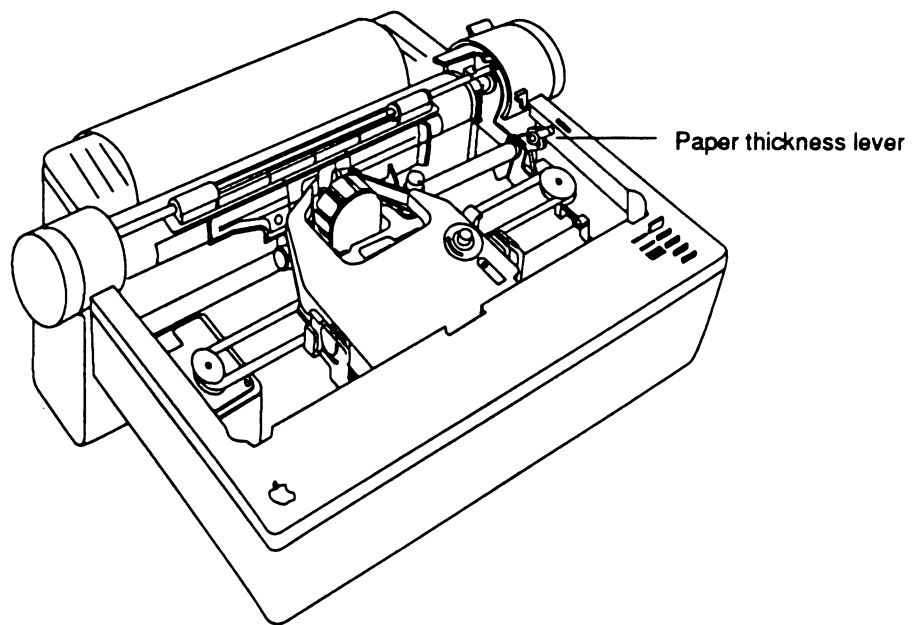
Figure 31. The paper thickness lever

For example, to print on envelopes, you should push the lever down to the second position for a two-sheet thickness, which is the normal thickness of envelopes. The next position is for three sheet thickness and the last position is for four sheet thickness.

Warning: *Never use a form, label, or envelope that is thicker than four sheets of 16-pound bond. Too much paper may cause lines to register incorrectly or may jam the printer.*

Using the ImageWriter II

Removing the Last Pin-Feed Page

If you are working with pin-feed paper, you might notice that when a print job ends, some of the last page remains inside the printer. Choose any of the following three ways to make tearing off the last page easier:

• Turn the printer off, turn the platen knob so that the perforation is just above the paper bail, and then turn the printer back on. The printer will stop at this position after each print job making it easy to tear off the last page. (Remember to adjust the top and bottom margins in the application to correct for the extra paper above the print line.)

• With the Select light off, press the Form feed button to eject the page.

• Leave the last page of the document in the printer until you print another document, then tear off the page.

Warning: *Do not back out labels or multipart forms. In other words, don't turn the platen knob counterclockwise when using labels. The labels or forms could separate and jam the printer or cause other damage.*

Continue with the next section - Module Summary.

Module Summary

What Have You Learned In This Module?

In this module, you learned how to set up and use the ImageWriter II. Some of the key points from this module are highlighted below.

Key Features

The key features of the ImageWriter II include:

- **User-selectable print quality** — the user can select draft quality, standard quality, or near letter quality. The higher the quality, the slower the printing process.

- **Varied print media** — users can print on pin-feed paper, single sheet paper, envelopes, labels, or multi-part forms.

- **Interchangable ribbon cartridge** — users can print in black or color by changing the ribbon cartridge.

- **Automatic paper loading** — users can load single sheet paper by the push of a button.

Accessories

Users can expand the capabilities of the ImageWriter II by adding any of the following:

- SheetFeeder— Allows you to load up to 100 single sheets of paper.

- 32K Memory Option— Expands printer memory. Designed for use with Apple II computers only.

- LocalTalk Option— Allows connection to an AppleTalk network.

Setting Up the Basic Unit

Before connecting the printer to a computer, you unpacked the printer from its shipping carton (saving the carton for later use), installed a ribbon, plugged in the unit, loaded pin-feed paper, and ran the self-test.

Connecting to a Macintosh

Connecting the ImageWriter II to a Macintosh involves four steps:

1. Check to make sure you have the ImageWriter printer resource on your system startup disk.

2. Plug the printer cable into the printer and the Macintosh.

3. Use the Chooser desk accessory to select the ImageWriter II.

4. Test the connection between the printer and the computer.

Module Summary

General Warning

Remember this warning: you should always turn off both the computer and the printer before connecting or disconnecting them. Changing cables when the power is on can damage the equipment.

Control Panel

The control panel has the following switches and lights:

- The On/Off switch turns the ImageWriter on and off. The green Power light is on when the printer is turned on.

- The Error light can indicate three problems. If it is on continuously, the printer has run out of paper. If it blinks steadily, the front cover is loose or off. If it blinks irregularly, DIP switch SW2-4 may be incorrectly set.

- The Select button places the printer in the mode to receive and print data. When the printer is in this receive or "select" mode, the Select light is on and the control panel is deactivated; only the On/Off switch works. If you want to use any of the other switches, you must press the Select button to turn off the Select light.

- The Print Quality button selects any of the three print qualities. When the left light is on, draft quality is selected. When the right light is on, quality is standard. Both lights on indicates near letter quality.

- The Line Feed button advances paper one line.

- The Form Feed button advances the paper one full page-length and loads and ejects single sheets of paper.

You have now completed this module.

Check your skills and knowledge against the Skills Checklist. Then take the Module Test.

Module Test

Directions

For items 1- 10, indicate if the statements are correct or incorrect by checking TRUE or FALSE.

1. The ImageWriter II can print on envelopes, multi-part forms, and labels.

   ___ TRUE   ___ FALSE

2. The ImageWriter II can print high resolution text and graphics.

   ___ TRUE   ___ FALSE

3. Users select print quality by changing DIP switches.

   ___ TRUE   ___ FALSE

4. The SheetFeeder allows users to load multiple single sheets of paper at one time.

   ___ TRUE   ___ FALSE

5. The 32K Memory Option works best with Apple II computers.

   ___ TRUE   ___ FALSE

6. To connect to an AppleTalk network, users have to install the Memory Option.

   ___ TRUE   ___ FALSE

7. Before they can use color ribbons, users have to install the optional color ribbon assembly.

   ___ TRUE   ___ FALSE

Module Test

8. To advance paper one line, first you press the Select button until the Select light is on, and then you press and release the Line Feed button.

___ TRUE   ___ FALSE

9. With single-sheet paper, pressing the Form Feed button will eject the paper from the printer.

___ TRUE   ___ FALSE

10. The red rings on the paper bail represent the absolute boundaries for printing.

___ TRUE   ___ FALSE

Directions

For items 11 through 15, circle the letter corresponding to the best answer.

11. Which quality is indicated by the following Quality light?
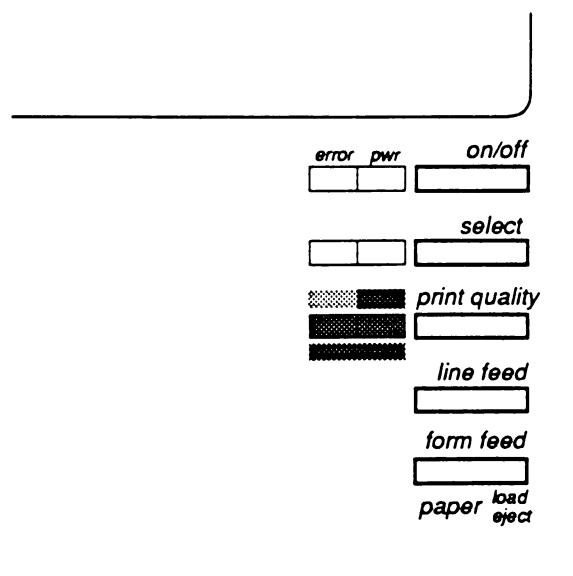
A. draft quality
B. standard quality
C. near-letter quality

Module Test

12. The Error light is continuously on—what does this indicate?

A. The printer has run out of paper.
B. The front cover may be loose or off.
C. The computer connection is loose.
D. DIP switch SW2-4 may be improperly set.

13. What does a regularly blinking Error light indicate?

A. The printer has run out of paper.
B. The front cover may be loose or off.
C. The computer connection is loose.
D. The Macintosh is powered off.

14. Assume that you are working with pin-feed paper. What happens when you press the Form Feed button?

A. The paper advances one line.
B. The printer loads the paper.
C. The printer sets "top-of-page."
D. The paper advances one full page length.

15. Assume that paper is loaded in a ImageWriter II with three inches of paper extending above the print line. You turn on the printer and use your application to set the top margin at one inch. When you print the next five pages of your work, how wide will the top margin actually be?

A. Approximately 1 inch.
B. Approximately 1 and 1/2 inch.
C. Approximately 3 inches
D. Approximately 4 inches.

Compare your answers to those on the following page.

Module Test (Answers)

Directions

Compare your answers to the ones below.

1. True

2. True

3. False - Users select print quality by pressing the Quality button.

4. True

5. True

6. False - To connect to an AppleTalk network, users must install the LocalTalk Option.

7. False - To use color ribbons, users must install only a color ribbon and use an appropriate software application.

8. False - To use the Line Feed, Form Feed, or Print Quality buttons, you must press the Select button until the Select light is OFF. Then you can use the buttons.

9. True

10. True

11. C

12. A

13. B

14. D

15. D

Reminder: *This written test does not verify that you can perform the hands-on tasks covered in this module. Be sure you can perform all of the tasks on the Skills Checklist before attending the Prerequisite Exam and the Lab part of this course.*

Table of Contents

Module Introduction

Overview

Apple produces a number of printed reference materials that provide details about service-related issues. Current reference materials include these manuals:

- the *Apple Service Technical Procedures* manuals
- the *Peripheral Interface Guide*
- the *Apple Service Module Identification* manual
- the *Apple Service Programs* manual
- the *Apple Service Prices* manual

Another reference is AppleLink, an electronic communication network that serves as a source of information and a mail system. AppleLink is available to Apple employees, service providers, developers, and other people in the computer market.

This module will describe the information provided by each reference and explain how each type of manual is organized. The module will also introduce you to AppleLink— what it is, why and when you should use it. You will learn how to use AppleLink in the Lab part of this course.

What You Will Learn

By the end of this module, you should be able to:

- Use the Apple service reference manuals
- Identify the functions and uses of AppleLink

The Skills Checklist states, in detail, the tasks you should be able to perform upon completion of this module.

How You Will Be Tested

Module Test - This written test will help you check your understanding of the uses of the reference materials.

Prerequisite Exam - The written part of this exam will verify that you understand the uses of these reference materials. You must pass this exam before you continue with the Lab part of this course

Module Introduction

Prerequisites to this Module

Before beginning this module, you must have completed the module *Welcome to Apple Service."*

Materials Provided For This Module

The Prerequisite provides the following items for this course:

• This Module Workbook
• Module Test

Materials You Need to Provide

To complete this module, you do not need any additional materials. However, if you have the Apple Service reference manuals at your site, you should refer to them as you go through this module.

How the Module Is Organized

This module is organized in two parts.

Part 1 - Overview— This part introduces the Apple Service references by giving a brief summary of what each one provides.

Part 2 - Using the References— This part covers how each type of manual organized. This part also covers how to obtain and update the reference manuals.

Following these two parts is a Module Summary.

Continue with the Skills Checklist on the following pages.

Skills Checklist

What Is the Skills Checklist?

This is a list of tasks that you should be able to perform at the conclusion of this module. The Prerequisite Exam (written and hands-on) will cover these items. During the Lab part of this course, you will be expected to be able to perform all of these tasks.

How to Use the Checklist

Before starting the module, check the items on this list to see which tasks you can already perform. If you are confident that you can already perform certain tasks, you may decide to skip those sections of the module. Or you may decide to try the Module Test without going through the module.

After completing the module, check this list to make certain that you have mastered all the skills before you attend the Prerequisite Exam, and the Lab part of this course. If you feel uncertain about any of these tasks, return to the section indicated, review the information and repeat the hands-on exercises.

Skills Checklist

		Task	Section Where the Task Is Covered
____	1.	Identify the types of information provided in the *Apple Technical Procedures* manuals.	Overview of Apple Service References, The *Apple Service Technical Procedures* Manuals
____	2.	Locate specific information in the *Apple Technical Procedures* manuals.	The *Apple Service Technical Procedures* Manuals
____	3.	Identify the types of information provided in the *Peripheral Interface Guide*.	Overview of Apple Service References The *Peripheral Interface Guide*
____	4.	Locate specific information in the *Peripheral Interface Guide*.	The *Peripheral Interface Guide*
____	5.	Identify the types of information provided in the *Module Identification* manual.	Overview of Apple Service References The *Module Identification* manual
____	6.	Locate specific information in the *Module Identification* manual.	The *Module Identification* manual
____	7.	Identify the types of information provided in the *Apple Service Programs* manual.	Overview of Apple Service References The *Apple Service Programs* manual
____	8.	Locate specific information in the *Apple Service Programs* manual.	The *Apple Service Programs* manual

Skills Checklist

	Task	Section Where the Task Is Covered
___	9. Identify the types of information provided in the *Apple Service Prices* manual.	Overview of Apple Service References The *Apple Service Prices* manual
___	10. Locate specific information in the *Apple Service Prices* manual.	The *Apple Service Prices* manual
___	11. Identify the procedures for obtaining and updating these reference materials.	Obtaining and Updating the Reference Manuals
___	12. State the two basic functions of AppleLink.	AppleLink
___	13. Indicate the recommended sequence for using the Apple references to find technical information.	AppleLink
___	14. Identify which type of reference manual would provide information to meet a specific need.	Exercise: Using Apple Service References

Continue with the next section - Overview of Apple Service References.

Overview of Apple Service References

Overview

This section introduces five types of Apple Service references by summarizing the content in each reference and explaining when to use each reference. Other sections in the module provide more details about each reference.

Apple Service Technical Procedures Manuals

The Apple Service Technical Procedures manuals will be your major source of technical information about Apple products. These manuals provide—for each Apple product—step-by-step directions for removing and replacing parts, performing upgrades, making adjustments, running diagnostics, and troubleshooting. The manuals also provide descriptions of product parts and exploded parts diagrams.

You will find the Technical Procedures manuals especially useful when you want to identify problems, replace parts, and perform upgrades.

Peripheral Interface Guide

The Technical Procedures Peripheral Interface Guide provides all the details you need to connect Apple computers to Apple and non-Apple peripheral devices (for example, printers and modems). This interface information includes pin-outs, switch settings, cable requirements, and diagrams of Apple computer interface ports, interface cards, and peripherals.

You will find this manual especially helpful when you are setting up peripheral devices and when you are trying to isolate a problem that might involve the product interface.

Module Identification Manual

The Module Identification manual lists the part numbers for all Apple exchange modules and provides photographs of the parts. The manual also gives critical details about the parts such as descriptions of compatibility with specific Apple products.

You will use this manual mainly to identify the numbers for parts you want to replace or order. It will also be helpful if you have difficulty identifying the name or version of a specific part.

Apple Service Programs Manual

The Apple Service Programs manual provides details about Apple policies for AppleCare, warranty repairs and reimbursements, administrative procedures, service policies and product notices.

Overview of Apple Service References

Apple Service Prices Manual

The Apple Service Prices binder contains Part numbers and Prices of all service parts, tools, training and Apple*Care* that can be purchased by an Apple authorised reseller.

Your most frequent use of this manual will be to locate prices of parts.

AppleLink

AppleLink provides a wealth of information that you can access with your computer and a modem. You can locate on AppleLink all of the information provided in the Apple Service Programs manual. In addition, you can access a wide range of "library articles" and special announcements. The AppleLink mail system allows you to correspond with other people on the AppleLink network.

Here are a few reasons you will use AppleLink:

- To read the description of a new product upgrade or a new product.
- To receive a system software update.
- To get registration details about Apple Service Training.
- To learn the most current policies for shipping defective parts to Apple.
- To locate an article about problems related to SCSI hard disks.
- To ask the Apple Technical Support Department about a specific technical problem you have not been able to resolve.

During the rest of this module you will gain greater familiarity with these Apple references. If you have the references, refer to them as you read this module.

Continue with the next section - The Apple Service Technical Procedures Manuals.

The Apple Service Technical Procedures Manuals

Overview

The *Apple Service Technical Procedures* manuals are your major technical reference. This section describes how these manuals are organized and explains how you can locate information in them.

General Organization

The *Technical Procedures* manuals are three-ring binders that come in the following sets:

- Macintosh Family — all Macintosh computers and other Apple products that can be used only with Macintosh computers
- Apple II Family— all Apple II computers and Apple products that can be used only with Apple II computers
- Cross Family Peripherals— Peripheral devices that can be used with Macintosh and Apple II family computers
- Laser Printers

The following sets are also available to service centers who service the products:

- Lisa/Macintosh XL
- Apple II/Apple III Product— This set is archived information. As such, it is not a subscription and is not updated. Any critical information will be communicated through the Apple II subscription program.

Each set consists of multiple volumes, with products grouped by product type. Figure 1 gives an example of how the content of the Technical Procedures is organized. Remember that the organization can vary with updates.

The Apple Service Technical Procedures Manuals

Apple Service Technical Procedures Manuals*

Macintosh Family Volume One
Macintosh/Macintosh Plus
Macintosh SE, Macintosh SE/30
Macintosh Portable

Macintosh Family Volume Two
Macintosh II/ Macintosh IIx
Macintosh IIcx
Macintosh IIci

Macintosh Family Volume Three
Apple High-Res Monochrome Monitor
AppleColor High-Res RGB Monitor
Apple Two-Page Monochrome Monitor
Apple Macintosh Portrait Display

Macintosh Family Volume Four
Macintosh Family Cards
Macintosh External Drives
Hard Disk 20
Apple PC 5.25 Drive
FDHD SuperDrive
AppleFax Modem
Apple Scanner

Apple II Volume One
Apple II/II Plus
Apple III
Apple IIe
Apple IIc
Apple IIGS

Apple II Volume Two
Multi-Product Diagnostics
Disk IIc
UniDisk 3.5
Apple 5.25 Drive/UniDisk
Monitor II
ColorMonitor IIe and IIc
AppleColor RGB Monitor
Apple Monochrome Monitor
Apple II Family Cards

Cross-Family Peripherals Volume One
Modems
Disk Drives
Apple 3.5 Drive
Hard Disk Drives
Apple Tape Backup 40SC
Apple CD SC

Cross-Family Peripherals Volume Two
ImageWriter
ImageWriter II
ImageWriter LQ

Cross-Family Peripherals Volume Three
Networks
AppleTalk
LocalTalk Cabling System
LocalTalk PC Card
AppleShare
EtherTalk Interface Card
Apple Line
Apple II Workstation Card

Laser Printers Volume One
LaserWriter
LaserWriter Plus

Laser Printers Volume Two
LaserWriter II

* Based on manuals available 5/89

Figure 1. Example of how information is organized in the Technical Procedures manuals

The Apple Service Technical Procedures Manuals

Product Tabs

The volumes are packaged in three-ring binders. Within each volume, every product has a tab. For example, in Volume Two of the Cross-Family Peripherals Technical Procedures, you will see three tabs: ImageWriter, ImageWriter II, and ImageWriter LQ.

Sections per Product

Behind each product tab there are several sections of procedures. The documentation for most products includes these sections:

- **Basics**— Identifies product features and connectors. Lists the basic modules of the product and explains their functions.

> **Note:** *Apple distinguishes between the terms **module and part**. Modules are parts (for example, circuit boards and power supplies) that you can exchange according to the Apple Exchange Program. (You will learn about this exchange program in the "Apple Service Administration" module). Parts are smaller components that you can replace but not exchange. You'll notice that in Apple documentation, modules are usually listed separately from parts.*

- **Take-Apart**— Provides step-by-step directions for removing and replacing modules and parts.

- **Diagnostics**— Provides procedures for using diagnostic programs that are available for identifying failures.

- **Troubleshooting**— Provides symptom charts and flowcharts to help you isolate problems to faulty or misadjusted modules and parts.

- **Illustrated Parts List**— Provides exploded diagrams of Apple products and lists the module/part names and numbers. You can use this section to identify modules and parts and their numbers when you want to look up prices in the *Apple Service Programs* manual.

Some products have additional sections such as:

- **Preventive Maintenance**— Provides step-by-step directions for taking care of the product, thus extending its life.

- **Adjustments**— Provides step-by-step directions for adjusting the product.

The Apple Service Technical Procedures Manuals

Using the Technical Procedures

Before you repair any new product for a customer, look over the technical procedures for the product and take time to practice the procedures. If you wish to see a procedure demonstrated before you attempt it, refer either to the Apple Service Programs manual or the Technical Procedures to see if a videotape is available for ordering.

Table of Contents

Each volume has a main Table of Contents that lists the products covered and the sections for each product. This list does not give page numbers, but does state the "Build Date" — the month and year that the section or pages were published, as shown in Figure 2.

Cross Family Peripherals

Volume Two

Table of Contents

–Title Page (contains build date)

ImageWriter			
	–Table of Contents		06/88
	–Introduction	08/83	
	(except pages 1.7, 1.8)		04/86
	–Take-Apart	06/88	
	–Troubleshooting	11/86	
	(except page 3.6)		06/87
	(except page 3.7)		07/86
	–TS Flow of Information - Appendix 3A		07/86
	–Illustrated Parts List	04/85	
	(except page 4.2)		12/87
	(except page 4.3)		02/87
	(except page 4.4)		01/88
	(except page 4.5)		04/86
	(except page 4.6)		07/86

Figure 2. Excerpt from a Technical Procedures volume main Table of Contents

The Apple Service Technical Procedures Manuals

Behind each tab, you will find a detailed Table of Contents that lists content and page numbers for the specific product, as shown in Figure 3.

Figure 3. Excerpt from a section Table of Contents

The Apple Service Technical Procedures Manuals

Page Numbers

Because the product parts of the *Technical Procedures* are treated as separate documents, they are numbered separately.

The page numbers indicate the section following the product tab and page within the section.

Examples:

Page 1.5 of the *Apple IIGS* section of the *Apple II Technical Procedures* indicates page 5 of section 1 behind the tab labeled Apple IIGS.

Page 2.3 of the *Macintosh SE* section of the *Macintosh Technical Procedures* indicates page 3 of section 2 behind the tab labeled Macintosh SE.

Optional Practice

If you have a set of the Technical Procedures Manuals, take time now to look over them.

First, to become familiar with how the procedures are organized into volumes, look over the main Table of Contents for each volume.

To practice locating specific information, try to find the following:

- take apart procedures for the ImageWriter II
- description of connectors on the Macintosh IIcx
- directions for adjusting the AppleColor RGB Monitor
- symptom chart for the Apple Scanner
- exploded diagram and part names for the Apple IIGS

Continue with the next section - The Peripheral Interface Guide

The Peripheral Interface Guide

Overview

The *Peripheral Interface Guide* provides details about connecting Apple computers to Apple and non-Apple peripheral devices. This section explains how this manual is organized and how you can locate details in the manual.

General Organization

The current *Peripheral Interface Guide* is is a bound, paper-back book. It is divided into five sections. Table 1 describes the content provided in each section. Following the table is additional explanation about each section and an example of the type of information provided in the section.

Note: *The examples provided in this section may not be current.*

The Peripheral Interface Guide

Peripheral Interface Guide
Sections Provided For Each Specific Product

Section	Content
Section 1 Computer Interface Ports: Pin-outs	Lists all the built-in interface ports on each Apple computer. Provides pin numbers, signal names, signal descriptions, and connector types. Notes special information related to the interface.
Section 2 Interface Cards: Pin-outs and Switch Functions	Covers the interface cards for each type of Apple computer. For each card, lists pin numbers, signal names, signal descriptions, and connector types. If the interface card contains any option switches, a table lists the functions of the switches and explains how they should be set to produce various operating characteristics.
Section 3 Peripheral Devices: Pin-outs and Switch Functions ~	Covers Apple peripheral devices. For each device, provides pin numbers, signal names, signal descriptions, and connector types. Lists option switch functions and settings.
Section 4 Configurations: Computers and Peripherals	Contains details required for connecting any Apple peripheral device to any Apple computer. Lists cables needed, option switch settings, and any special notes or requirements.
Section 5 Cable and Connector Specifications	Lists all the standard Apple peripheral cables, with their pin connections. Includes diagrams of the various connectors used, with pin designations indicated.

Table 1

The Peripheral Interface Guide

Using the Peripheral Interface Guide

The easiest way to use this guide is to refer to the main Table of Contents provided at the beginning of the book. This is a complete listing of the contents of the guide. Each section also has a Table of Contents.

Page Numbers

Page numbers in the *Peripheral Interface Guide* indicate the section and page within the section.

Example: Page 4.23 indicates page 23 of section 4.

Section 1 - How It Is Organized

Section 1 contains the specifications for all of the built-in interface ports on each type of Apple computer. Information is arranged by computer type.

For each computer type, you will find:

- a drawing that shows locations of the interface ports
- a list of all the built-in interface ports
- pin numbers, signal names, signal descriptions, and connector types
- additional information that is specific to the interface

Example from Section 1

Figure 4 provides an example of the information presented in Section 1 of the *Peripheral Interface Guide*. This example shows part of the information given about the interface ports on the Macintosh SE.

Take a few minutes now to look at this example. Note what type of information is provided and how it is organized.

The Peripheral Interface Guide

❏ **MACINTOSH SE AND SE/30**

Apple Desktop Bus Connector	Pin No.	Signal Description	Pin No.	Signal Description
	1	Data	3	Power (+5v)
	2	Reserved	4	Ground

Connector Type: Mini DIN-4 Male

Total length of all cables should not exceed 16 feet (5 meters)
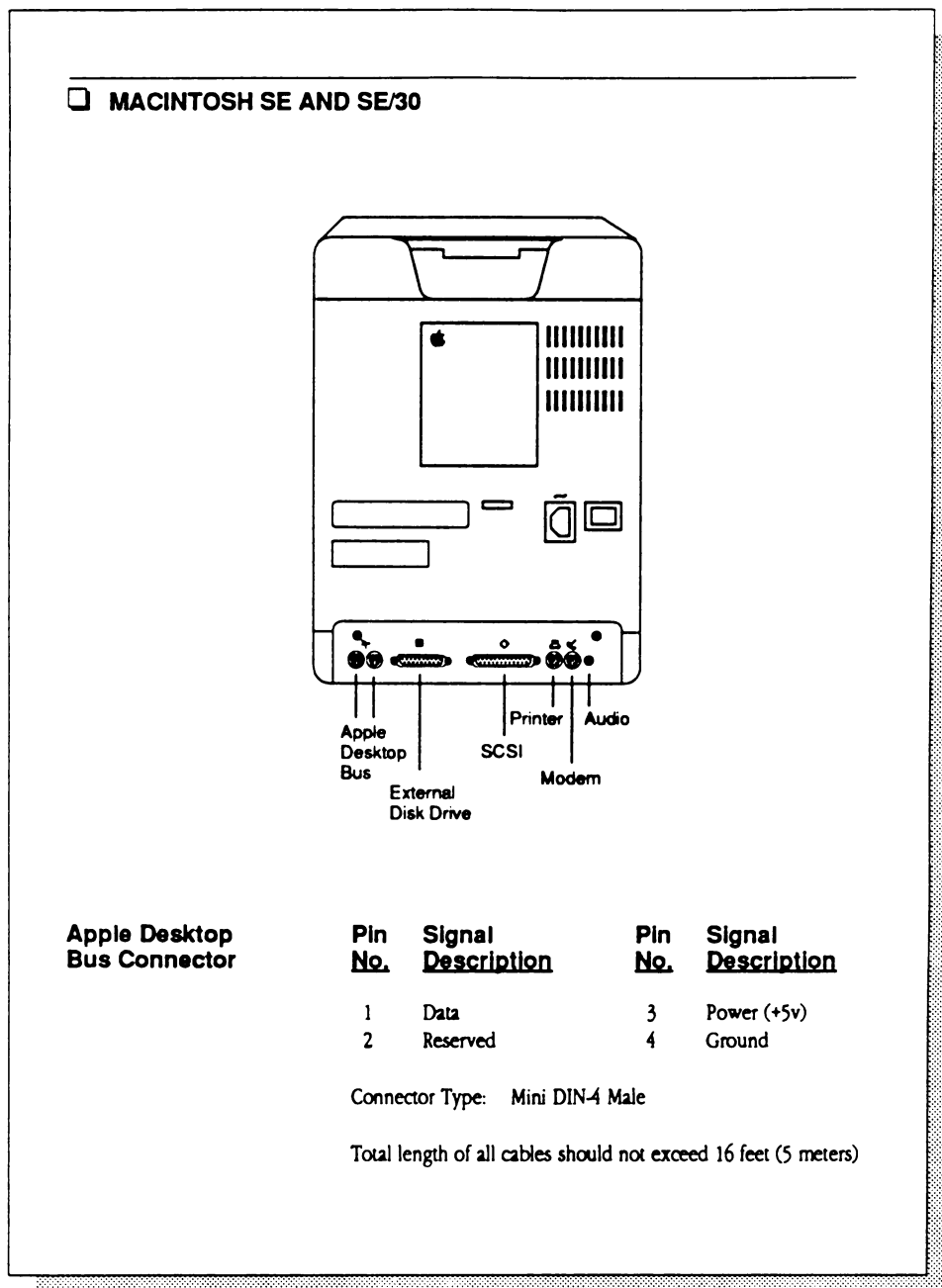
Figure 4. Example from Section 1 of the Peripheral Interface Guide

Optional Practice   If you have a copy of the *Peripheral Interface Guide*, take time now to look at Section 1. Look at the section Table of Contents to see how the section is organized. Then, look through the section to see the type of details provided.

The Peripheral Interface Guide

Section 2 - How It Is Organized

Section 2 contains all the specifications for Apple interface cards. Information is arranged by computer type.

For each computer type, you will find:

- a list of all the interface cards for that specific computer type
- pin numbers, signal names, signal descriptions, and connector types for each interface card
- additional interface details specific to each card

Example from Section 2

Figure 5 is an example of the information in Section 2 of the *Peripheral Interface Guide*. The example shows part of the information given about the Macintosh II interface cards.

Take a few minutes now to look at the example. Note the type of information is provided and how it is organized.

❑ MACINTOSH II, IIx, IIcx

Video and Monochrome Card	Pin No.	Signal Description	Pin No.	Signal Description
	1	Signal ground (Red)	9	Analog blue video
			10	No connection
	2	Analog red video	11	No connection
	3	Composite sync	12	No connection
	4	Signal ground (Sync)	13	Signal ground (Blue)
	5	Analog green video		
	6	Signal ground (Green)	14	No connection
			15	No connection
	7	No connection	(Shield)	Shield ground
	8	No connection		

Connector Type: Mini DIN-4 Male

Caution: *The signals in this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III and III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the Video Card.*

Figure 5. Example from Section 2 of the Peripheral Interface Guide

The Peripheral Interface Guide

Optional Practice

If you have a copy of the *Peripheral Interface Guide*, take time now to look at Section 2. As you did with Section 1, look at the section Table of Contents and then look through the section.

Section 3 - How It Is Organized

Section 3 contains interface specifications for Apple peripheral devices. Information is arranged by peripheral type.

For each peripheral type, you will find:

- pin numbers, signal names, signal descriptions, and connector types for each interface card
- factory switch settings and switch settings for specific characteristics (provided if the device has switches)

Example from Section 3

Figure 6 on the next page provides an example of the information in Section 3 of the *Peripheral Interface Guide*. This example shows part of the information given about the ImageWriter II.

Take a few minutes now to look at the example. Note the type of information is provided and how it is organized.

Note: *This section refers to switches as either "ON" (closed) or "OFF" (open). The factory switch settings are shown in bold type.*

The Peripheral Interface Guide

❑ ImageWriter II

Pin-outs

Pin No.	Signal Name	Signal Description
1	DTR	Data Terminal Ready (output)
2	DSR	Data Set Ready (input)
3	TXD–	Transmit Data
4	SG	Signal Ground
5	RXD–	Receive Data
6	TXD+	Balanced transmit +
7	NC	No connection
8	RXD+	Balanced receive +
(Shield)	PG	Protective Ground

Connector Type: Mini DIN-8 Male

Switch 1

	1	2	3	4	5	6	7	8
CHARACTER SET								
American	OFF	OFF	OFF					
Italian	ON	OFF	OFF					
Danish	OFF	ON	OFF					
British	ON	ON	OFF					
German	OFF	OFF	ON					
Swedish	ON	OFF	ON					
French	OFF	ON	ON					
Spanish	ON	ON	ON					
FORM LENGTH								
11 inches				OFF				
12 inches				ON				
PERFORMATION SKIP								
Disabled					OFF			
Enabled					ON			
CHARACTERS PER INCH								
10						OFF	OFF	
12						ON	OFF	
17						OFF	ON	
Proportional						ON	ON	
AUTO LF ON CR								
Disabled								OFF
Enabled								ON

Figure 6. Example from Section 3 of the Peripheral Interface Guide

The Peripheral Interface Guide

Optional Practice

If you have a copy of the *Peripheral Interface Guide*, take time now to become familiar with the content and organization of Section 3.

Section 4 - How It's Organized

Section 4 contains the information necessary to connect any Apple peripheral device to any Apple computer. Information is organized by peripheral type.

For each peripheral type, you will find:

- standard switch settings
- optional switch settings for specific computer types
- special notes as appropriate

Example from Section 4

Figure 7 on the next page is an example of the information in Section 4 of the *Peripheral Interface Guide*. This example shows part of the information given about the ImageWriter II.

Take a few minutes now to look at this example. Note the type of information is provided and how it is organized.

The Peripheral Interface Guide

❑ ImageWriter II

**Standard
Switch
Settings**

The standard switch settings are:

SW1	1	2	3	4	5	6	7	8
	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF

SW2	1	2	3	4
	ON	ON	OFF	OFF

These settings configure the printer as follows:

American character set
11-inch form
Perforation skip inactive
No LF on CR
12 chars/inch
9600 baud
DTR handshaking
No option card installed

**Apple II, II Plus,
IIe, and IIGS**

With a High Speed Serial Card, use cable 590-0335. Set the DIP switches on the card as follows:

SW1	1	2	3	4	5	6	7	8
	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF

These settings configure the interface as follows:

300 baud
No delay on CR
132 columns/video off
Auto LF on CR

Note: *You must use a P8 PROM (not a P8A PROM) on the High Speed Serial Card. Set the ImageWriter II Switch 2 (SW2) positions 1 and 2 to OFF (300 baud).*

Figure 7. Example from Section 4 of the Peripheral Interface Guide

The Peripheral Interface Guide

Optional Practice

If you have a copy of the *Peripheral Interface Guide*, take time now to become familiar with the content and organization of Section 4.

Section 5 - How It's Organized

Section 5 contains the pin connections, colors, and connector types for Apple peripheral cables. The first part of this section describes each peripheral cable type. The second part describes each connector type.

Section 5 concludes with diagrams that show the pin numbers for each connector type.

Example from Section 5

Figure 8 provides an example of the information presented in Section 5 of the *Peripheral Interface Guide*.

Take a few minutes now to look at this example.

❑ **CABLE SPECIFICATIONS**

Cable 590-0029	DB-25 Male	DB-25 Female
	1	1
	2	3
	3	2
	4 and 5	8
	6	20
	7	7
	8	4 and 5
	20	6

Color: light gray

This is a modem eliminator cable, used to connect the Apple III, III Plus, and Lisa/Macintosh XL to serial ports on devices other than modems.

This cable has been replaced by 590-0166.

Figure 8. Example from Section 5 of the Peripheral Interface Guide

The Peripheral Interface Guide

Optional Practice If you have a copy of the *Peripheral Interface Guide,* take time now to become familiar with the content and organization of Section 5.

Continue with the next section - The Module Identification Manual.

The Module Identification Manual

Overview

The *Module Identification* manual describes Apple modules. This manual contains photographs of Apple service modules, both original and revised versions. It also lists their part numbers and states other critical details about the parts.

You can use the *Module Identification* manual to:

- identify modules
- identify versions of modules
- find the right part number for the Service Repair Order (SRO) form
- find out how to package module for shipping
- avoid having Apple refuse unacceptable modules

This section describes how the *Module Identification* manual is organized and how you locate information in it.

General Organization

The *Module Identification* manual is a three-ring binder. The content is organized by product type; for example, the edition available in May, 1989 contained these sections divided by tabs:

- CPU PCBs
- Keyboards
- Power Supplies
- Interface Cards
- Monitors
- Drives
- Data Communications
- Printers
- Input Devices

Within each tabbed section, the pages are organized in subsections. For example, behind the tab marked CPU PCBs, the Apple II PCBs are grouped together, followed by the Apple IIe PCBs, etc.

The Module Identification Manual

Page Numbers

Page numbers in the *Module Identification* manual consist of three numbers separated by periods. The first number refers to the major section, indicated by a tab. The second number refers to the subsection. The third number is the page within the subsection.

For example, the page number 4.1.11 can be interpreted as follows:

```
              4.1.11
              ▲ ▲ ▲
              | | |
section ──────┘ | |
subsection ─────┘ |
page ─────────────┘
```
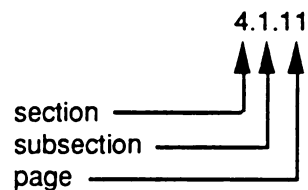
Table of Contents

The *Module Identification* manual includes three types of aids to help you identify products and their part numbers. First, the Table of Contents, provided at the beginning, lists the general sections.

Next, following the Table of Contents is a *Module Index by Page Number*. This is a detailed list of the products covered in each section, with their page numbers. Figure 9 provides an excerpt from this index.

The Module Identification Manual

Module Index by Page Number

Description   Page No.

CPU PCBs

Description	Page No.
Apple II Motherboard with RAM N/RFI	1.1.1
Apple II Motherboard with RAM RFI	1.1.2
Apple II Plus Motherboard with RAM N/RFI	1.1.3
Apple II Plus Motherboard with RAM N/RFI (Rev 7)	1.1.4
Apple II Plus Motherboard with RAM RFI (Rev D)	1.1.5
Apple II Plus Motherboard with RAM RFI	1.1.6
Apple IIe Main Logic Board (Rev A)	1.2.1
Apple IIe Logic Board Unenhanced	1.2.2
Apple IIe Logic Board Enhanced	1.2.3
Apple IIe Logic Board Enhanced	1.2.4
Apple IIc Logic Board	1.3.1
Apple IIc Logic Board Expandable	1.3.2
Apple IIc Plus Logic Board	1.3.3
Apple III Logic Board 5v	1.4.1

Figure 9. Excerpt from the *Module Index by Page Number* of the *Module Identification* manual

---

Cross Reference

The third aid, entitled *Module Cross Reference By Part Number*, lists Apple products by their part numbers and states the pages where they are described in the manual. Figure 10 provides an example of the cross reference.

The Module Identification Manual

Module ICross Reference By Part Number Continued...

Part No.	Page No.	Description
661-AIM	7.1.5	Modem 1200 Interface Card IIe, IIGS
661-0110	6.14.1	AppleCD SC CD SC Drive Mechanism
661-0237	5.3.3	AppleColor Monitor 100 Power Supply
661-0238	5.3.1	AppleColor Monitor 100 Logic Board (Rev 0)
661-0256	4.1.27	Apple IIGS Memory Expansion Board, 256 KJ
661-0258	9.5.1	Apple II Mouse
661-0259	9.5.1	Apple IIe Mouse
661-0260	7.3.1	Apple Cluster Controller Connector Board
661-0262	4.1.19	Apple IIe Ext. 80 Column AppleColor Card
661-0264	6.3.1	Apple IIc Drive Mechanical Assembly
661-0265	6.3.2	Apple IIc Drive Analog Board
661-0266	8.7.5	LaserWriter Power Supply 110v
661-0267	8.7.2	LaserWriter DC Controller
661-0268	8.7.6	LaserWriter Driver 110v
661-0269	8.7.7	LaserWriter Driver 220v
661-0270	8.7.1	LaserWriter I/O Board
661-0273	8.7.3	LaserWriter Power Supply/Motor Drive 110v

Figure 10. Excerpt from the *Module Cross Reference By Part Number* of the *Module Identification* manual

Optional Practice

If you have a copy of the *Module Identification* manual, take time now to look it over.

• Look at the Table of Contents at the beginning of the manual. Note that the manual is organized into sections by product type.

• Look at the *Module Index by Page Number*. Can you identify which page provides information about the LaserWriter II DC Power Supply

The Module Identification Manual

- Look at the *Module Cross Reference By Part Number*. Can you identify which page provides information about the product numbered 661-0428?

- Locate a photograph of the ImageWriter II Main Logic Board.

- Locate the part number of the Apple II Workstation Card.

Continue with the next section - The Apple Service Programs Manual.

The Apple Service Programs Manual

Overview

The *Apple Service Programs* manual provides information about doing business with Apple. This includes Apple's policies for warranty repairs, reimbursements, administrative procedures, support and training programs.

This section describes how this manual is organized and how to locate information in it.

Manual Organization

The *Apple Service Programs* manual is a three-ring binder, organized into eight sections. The content and organization of this manual may change with updates.

A general Table of Contents is provided at the beginning of the manual and each tab divided section has a more detailed Table of Contents.

To find information on a given topic, look first at the main Table of Contents. This will enable you to identify which section contains the information you need. Then, you can use the section Table of Contents to locate the exact page of the information you need.

Page Numbers

Page numbers in this manual consist of three numbers separated by periods, as shown in the representation below. The first number refers to the major section. The second number refers to the subsection. The third number is the page within the subsection.

7.6.11

section
subsection
page
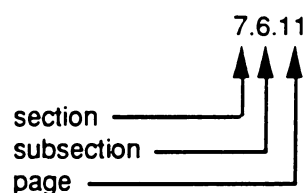
Table 2, on the next two pages, provides a sample main Table of Contents.

The Apple Service Programs Manual

Table of Contents

Table 2

The Apple Service Programs Manual

Table 2, continued

Optional Practice

If you have a copy of the *Apple Service Programs* manual, take time now to look it over. Here are some things you can do to become more familiar with the manual :

- Locate the Apple Support Centre closest to your site.
- Locate the Service Notice concerning the Macintosh SE30 Upgrade policy
- Locate the policy regarding packing and shipping of a module.
- How to order parts from Apple.

Continue with the next section - The Apple Service Prices Manual

The Apple Service Prices Manual

Overview

The *Apple Service Prices* manual provides pricing information about Service modules and parts. It also provides Training and AppleCare price information.
You will use this manual primarily to **locate Service prices by Part number.**
Note that you should normally use the *Technical Procedures* (Illustrated Parts List) or *Module Identification Manual* to locate part numbers first.

Manual Organisation

The *Apple Service Prices* manual is a three-ring binder, organized into nine sections.
The content and organization of this manual may change with updates.
For each product, part numbers are listed first followed by an abbreviated description and then the prices. Note that for a given product, Exchange modules are listed before spare parts.

Table 3, below , provides a sample Table of Contents.

Table of Contents

Page #

Table 3

The Apple Service Prices Manual

Table 3, continued.

If you have a copy of the *Apple Service Prices* manual, take time now to look it over. Here are some things you can do to become more familiar with the manual :

* Locate the Price and Part number of an ImageWriter II Printhead.
* Decide whether the ImageWriter II Printhead is a spare part or an exchange module.
* Locate the Price and Part number of a Macintosh Plus Power/Sweepboard.

Continue with the next section - Obtaining and Maintaining the Reference Manuals.

Obtaining and Maintaining the Reference Manuals

Overview

Previous sections of this module described these five reference manuals:

- *Apple Service Technical Procedures*
- *Peripheral Interface Guide*
- *Module Identification* manual
- *Apple Service Programs* manual
- *Apple Service Prices* manual

This section describes the procedures for obtaining and maintaining the reference manuals.

Required Documents

The information provided in these manuals is critical to service operations so all four of these manuals are **required** for **every** authorized Apple servicing account. Of the Technical Procedures manuals, your site must have only the volumes related to the CPU family or families that you service.

Where to Obtain the References

When a technician from a servicing location completes this course, the location is authorized to order these reference materials. Each authorized location is entitled to order sets of manuals and updates from Apple Service. After the first year the servicing location must pay annually to receive further updates.

This means that if another technician from your site has already completed this course, you should already have these materials at your location. If not, when you complete this course, your location will will be able to order them.

Additional copies can be purchased through Apple's Sydney Support Centre, as listed in the *Apple Service Prices* manual.

Updates

As Apple releases updates and new pages, they are sent to your site in a US letter (8-1/2 x 11-inch) format. Normally updates are plastic wrapped and in envelopes. A document control sheet will tell you the pages to add, replace, and discard. Store the document control sheets at the front of the manual (behind the Table of Contents) as a record of your updates.

Obtaining and Maintaining the Reference Manuals

Maintaining these Materials

These reference materials are useful only if you keep them updated. As you receive updates and revisions, update the materials immediately.

Another employee at your site may have already assumed the responsibility for maintaining the materials. Otherwise, you might consider taking on that responsibility — to see that the manuals are well-maintained, updated and properly stored in their designated shelf or cabinet. Encourage other employees to help out. That way, the reference materials will always be available, complete and current whenever anyone needs them.

Continue with the next section - AppleLink.

AppleLink

Overview

AppleLink is an electronic communication network designed to speed communications between Apple and authorised resellers. This section will briefly introduce AppleLink to you so that you are aware of its importance as a valuable source of information. During the Lab part of this course, you will learn how to use AppleLink.

AppleLink Functions

AppleLink is an information and communication tool that contains "libraries" and current news to help answer your questions about Apple products and service programs. It provides 24-hour access to a wide variety of information distributed by Apple. AppleLink is also an electronic mail system that lets you easily and efficiently do business with Apple. You save time and money by avoiding "telephone tag" and costly long distance phone calls.

AppleLink Uses

As an Apple service technician, you will most commonly use AppleLink to:

- News items or News flashes relavent to Apple Service.
- get technical information, product descriptions, specifications and current service notices
- download the latest price list spreadsheet for Apple Service parts
- download Apple software updates
- request technical assistance (TAR) from Apple Technical Support

Information Is Easy to Access

The AppleLink libraries provide information about products, prices, programs and policies. The libraries are designed to help you easily find the information you are looking for. All you have to do is type search words indicating your area of interest. After scanning all the documents in the library, AppleLink will display the titles of the documents that contain your search word or combinations of search words.

Apple provides current announcements on AppleLink "bulletin boards." For example, the Apple Service and Training Groups use the Training bulletin board and the Service bulletin board to provide details about training courses and to announce new service procedures. When you access a bulletin board, you will see a list of the articles available. You can select the article you want to see, and then read or print it.

AppleLink

AppleLink Mail

The AppleLink mail system allows you to correspond with other people on the AppleLink network.

If you cannot find the technical information you need in the Apple Technical Procedures or the AppleLink libraries and bulletin boards, you should use the Technical Assistance Request (TAR). Guidelines for general format are provided in the "Technical Support" folder (Apple Pacific / Australia / Technical Support). After preparing your request, mail it by AppleLink to the appropriate address; AUSTTECHSUPP. Apple Technical Support will provide the information you request as quickly as possible.

A Valuable Resource

AppleLink will quickly become one of your primary sources for obtaining technical information from Apple. We suggest that when you need technical information you proceed as follows:

* First check the Apple Service Technical Procedures and other relevant manuals.
* Then check the AppleLink libraries and bulletin boards.
* If you cannot find the information you need, send a TAR to **AUSTTECHSUPP**
* Finally, as a last resort, telephone the appropriate Apple Customer Service Group.

How to Get AppleLink

AppleLink is for authorized Apple servicing accounts only. To get AppleLink for your organization, ask your Apple sales representative to submit an Address Request Form and Licensing Agreement for you.

Continue with the next section - Exercise: Using Apple Service References.

Exercise: Using Apple Service References

Directions

Items 1 through 11 describe information you might need to perform one of your service tasks. For each numbered item, select the Apple reference material that would most likely provide the information needed. Write the letter(s) of the selected reference material on the space provided for the item.

A. *Technical Procedures* manuals
B. *Peripheral Interface Guide*
C. *Module Identification* manual
D. *Service Programs* manual
E. *Service Prices* manual

___ 1. To order a new Apple Scanner power supply board, you need its price and part number.

___ 2. To connect a non-Apple printer to a Macintosh II, you need the pin-outs and connector types.

___ 3. You need to identify the PCB that you found in a box at your site.

___ 4 You need directions for removing the Main Logic board from the ImageWriter II.

___ 5. You aren't sure if a specific interface card is an exchange module.

___ 6. You need to verify that the switch settings on an ImageWriter II match the factory-settings.

___ 7. To order the diagnostics for the Apple II family, you need the part number(s) and price(s).

___ 8. You need to check the criteria for returning a defective module to Apple Computer.

___ 9. You need directions for running the Apple Scanner diagnostics.

___ 10. A customer brought in an Apple keyboard that you have never seen before. You need to determine its name and part number.

___ 11. You need to know if a Macintosh purchased in Fiji is valid for warranty in Australia.

Exercise: Using Apple Service References

Directions: Answer items 12 and 13 as indicated.

12. What are the two main functions of AppleLink?

    1)_____

    2)_____

13. Assume that you need some technical details about an Apple product. In what order should you try to following to get the information you need? Write the numbers 1-4 to indicate the recommended sequence, with 1 indicating the first thing you should do.

    ___ Check the AppleLink libraries.

    ___ Send a TAR to Technical Support.

    ___ Check the Apple Service Technical Procedures or other relevant reference material.

    ___ Telephone the Apple Customer Service group that you think would have the information.

Exercise: Using Apple Service References

Compare your answers with those on the following page.

Exercise: Using Apple Service References (Answers)

Answers

1. E. *Apple Service Module Identification* manual
2. B. *Peripheral Interface Guide*
3. C. *Apple Service Module Identification* manual
   or
   A. *Apple Service Technical Procedures* manuals
4. A. *Apple Service Technical Procedures* manuals
5. E. *Apple Service Prices* manual
6. B. *Peripheral Interface Guide*
7. E. *Apple Service Prices* manual
8. D. *Apple Service Programs* manual
9. A. *Apple Service Technical Procedures* manuals
10. C. *Apple Service Module Identification* manual
11. D. *Apple Service Programs* manual

12. 1) Provide information
    2) Provide a mail service, a communication tool

13. _2_ Check the AppleLink libraries.

    _3_ Send a TAR.

    _1_ Check the Apple Service Technical Procedures or other relevant reference material.

    _4_ Telephone the Apple Customer Service group that you think would have the information.

Directions

If you missed more than two of these items, review the information provided in this section.

Otherwise....

Continue with the next section - Module Summary.

Module Summary

In this module, you learned to use the basic Apple reference materials and you were introduced to AppleLink. Here is a brief review of the information provided in each type of reference.

Basic Reference Materials

- *Apple Service Technical Procedures* manuals

  Provides details about Apple products. This includes procedures for servicing Apple products: removing and replacing modules, making adjustments, and troubleshooting.

- *Peripheral Interface Guide*

  Provides information needed to connect Apple and non-Apple peripheral devices to Apple computers: pinouts, DIP switch settings, and cabling requirements.

- *Module Identification* manual

  Provides details about specific Apple service modules. Includes photographs of each module, module numbers, and other critical information such as shipping directions.

- *Apple Service Programs* manual

  Provides details about doing business with Apple. This includes Apple's policies for warranty repairs and reimbursements, administrative procedures, such as the Service Repair Order form, and pricing information.

- *Apple Service Prices* manual

  Provides details of Service Module, Spare Parts, AppleCare and Service Training prices.

Maintenance

As you continue to work with Apple products, you will become increasingly familiar with these materials. However, reference materials are valuable only to the degree that you keep them updated. As you receive updates, immediately add them to the manuals you have. **Don't forget to store the document control sheets at the front of the manuals.**

Other people at your site may need to use these reference materials too, so always return them to their designated storage place.

Module Summary

AppleLink

AppleLink is an electronic communication network that provides extensive information in libraries and bulletin boards and serves as a communication tool. You can use AppleLink to:

- get numbers and prices for Apple service parts
- get technical information, product descriptions and specifications, and current service notices
- order service parts and finished goods and check on order status
- download Apple software updates
- request technical assistance from Apple Technical Support

Sequence for Using Reference Sources

Apple recommends that when you need technical information you use the reference sources in this sequence:

1) Check the Apple Service Technical Procedures and other relevant manuals.
2) Check the AppleLink libraries and bulletin boards.
3) Send a TAR to **AUSTTECHSUPP**.
4) As a last resort, Telephone the Apple Customer Service group that you think would have the information.

Check your skills and knowledge against the Skills Checklist for this module. When you are ready, take the Module Test.

Module Test

Directions

Items 1 through 9 point out a need for specific information. For each item, indicate where you would find the information. Circle the letter corresponding to the best answer.

1. You need to change the ImageWriter II switch settings. Where can you find details about these settings?

   A. The *Apple Service Technical Procedures* manuals
   B. The *Peripheral Interface Guide*
   C. The *Module Identification* manual
   D. The *Apple Service Programs* manual
   E. The *Apple Service Prices* manual

2. You suspect a faulty SIMM on a Macintosh SE. Where can you find directions for isolating the faulty SIMM?

   A. The *Apple Service Technical Procedures* manuals
   B. The *Peripheral Interface Guide*
   C. The *Module Identification* manual
   D. The *Apple Service Programs* manual
   E. The *Apple Service Prices* manual

3. Where can you find the pinout for the Macintosh Plus audio connector ?

   A. The *Apple Service Technical Procedures* manuals
   B. The *Peripheral Interface Guide*
   C. The *Module Identification* manual
   D. The *Apple Service Programs* manual
   E. The *Apple Service Prices* manual

4. You need to order a new Logic Board for a Macintosh II. Where do you find both the part number and the price?

   A. The *Apple Service Technical Procedures* manuals
   B. The *Peripheral Interface Guide*
   C. The *Module Identification* manual
   D. The *Apple Service Programs* manual
   E. The *Apple Service Prices* manual

Module Test

5. You can't remember how the pins are numbered on a DA-15 connector. Where can you find this information?

    A. The *Apple Service Technical Procedures* manuals
    B. The *Peripheral Interface Guide*
    C. The *Module Identification* manual
    D. The *Apple Service Programs* manual
    E. The *Apple Service Prices* manual

6. You need to install a new fan in an Apple Hard Disk SC. Where can you find the directions for this task?

    A. The *Apple Service Technical Procedures* manuals
    B. The *Peripheral Interface Guide*
    C. The *Module Identification* manual
    D. The *Apple Service Programs* manual
    E. The *Apple Service Prices* manual

7. You have two different Apple IIGS logic boards. You want to identify the name and part number of each one.

    A. The *Apple Service Technical Procedures* manuals
    B. The *Peripheral Interface Guide*
    C. The *Module Identification* manual
    D. The *Apple Service Programs* manual
    E. The *Apple Service Prices* manual

8. Where can you find Apple policy and procedures for the Apple*Care* Service Plan?

    A. The *Apple Service Technical Procedures* manuals
    B. The *Peripheral Interface Guide*
    C. The *Module Identification* manual
    D. The *Apple Service Programs* manual
    E. The *Apple Service Prices* manual

Module Test

9. You need the directions for installing the ImageWriter II ribbon cartridge.

    A. The *Apple Service Technical Procedures* manuals
    B. The *Peripheral Interface Guide*
    C. The *Module Identification* manual
    D. The *Apple Service Programs* manual
    E. The *Apple Service Prices* manual

Directions: *Answer items 10 and 11 as indicated.*

10. What are the two basic functions of AppleLink? Write your answers in the spaces provided.

    1) _____

    2) _____

11. What is the sequence recommended by Apple for using the reference sources when you need technical information? Write the numbers 1-4 to indicate the recommended sequence, with 1 indicating the first thing you should do.

    ___ Check the AppleLink libraries.

    ___ AppleLink **AUSTTECHSUPP** a TAR.

    ___ Check the Apple Service Technical Procedures or other relevant reference material.

    ___ Telephone the Apple Customer Service group that you think would have the information.

Compare your answers to those on the next page.

Module Test (Answers)

1. B

2. A

3. B

4. E

5. B

6. A

7. C

8. D

9. A

10. 1) Provide information
    2) Provide mail service, a communication tool

11. _2_　Check the AppleLink libraries.

　　 _3_　AppleLink **AUSTTECHSUPP** a TAR .

　　 _1_　Check the Apple Service Technical Procedures or other relevant reference material.

　　 _4_　Telephone the Apple Customer Service group that you think would have the information.

Now, Continue with the next module.

Table of Contents

Module Introduction

Overview

Apple offers a number of programs to support your service business. These programs include the Apple Limited Warranty, AppleCare and the Module Exchange Programs, all of which provide financial benefits to you and your customers. In addition, Apple offers replacement modules and parts, training, and other service materials.

To take full advantage of these support programs, you need to satisfy the administrative requirements defined by Apple. Here is an overview of these requirements:

Service Repair Order Form

When you perform service jobs for which you will return defective parts to Apple or which are covered by an Apple warranty program, you complete the Apple Service Repair Order (SRO) form. This one-page form provides a means for you to record customer information, to document service work and costs, to order replacement parts and to return defective parts to Apple.

Parts Order Form

When you need to order parts or materials from Apple, without sending in defective modules, you complete the Parts Order Form and send it by mail or FAX.

AppleCare Order Form

When you sell a customer AppleCare Apple's extended maintenance program, you complete the AppleCare Order Form.

Whether you are returning defective parts to Apple, ordering parts, or ordering AppleCare, Apple expects you to provide all the required information and to complete the SRO, AppleCare and Parts Order forms completely and accurately.

Module Introduction

What You Will Learn

In this module, you will learn about these Apple service programs and the administrative tasks that Apple expects you to perform. By the end of this module, you will be able to:

- Fill out the required forms completely and accurately
- Identify where to obtain materials and assistance

The Skills Checklist following this Module Introduction lists, in detail, the tasks you should be able to perform upon completion of this module.

How You Will Be Tested

The Module Test— This written test will help you verify that you understand the Apple administrative requirements and that you can fill out the required forms.

The Prerequisite Exam— This test will verify that you have mastered the skills listed on the Skills Checklist and are ready for the Lab part of this course.

You will be able to refer to course materials throughout the tests.

Prerequisites to the Module

Before beginning this module, you must have completed the following modules:

- Welcome to Apple Service
- Using Apple Reference Materials

Materials Provided for this Module

The Prerequisite provides the following items for this module:

- This Module Workbook
- Module Test

Module Introduction

How the Module Is Organized

This module is presented in four parts. :

Part 1 - Warranty Programs— This part describes Apple's warranty and extended maintenance programs: the Limited Warranty and AppleCare. You will learn what these two programs cover and how to fill out the AppleCare form for customers who buy the extended coverage.

Part 2 - Exchange Programs— This part describes the programs provided by Apple to cover the exchange of parts.

Part 3 - Service Repair Order Form— This part explains how to fill out the Service Repair Order (SRO) form.

Part 4 - Other Administrative Tasks— This part explains how to perform other administrative tasks such as packing and shipping defective parts to Apple and ordering parts from Apple.

Skills Checklist

What Is the Skills Checklist?

This is a list of tasks that you should be able to perform at the conclusion of this module. The Prerequisite Exam (a written and hands-on test) will cover these items. During the Lab part of this course, you will be expected to be able to perform all of these tasks.

How to Use the Checklist

Before starting this module, you should check the items on this list to see which tasks you can already perform. If you are confident that you can already perform certain tasks, you may decide to skip those parts of the module. Or you may decide to try the Module Test without going through the module.

After completing the module, you should check this list to make certain that you have mastered all the skills before you attend the Prerequisite Exam and the Lab part of this course. If you feel uncertain about any of these tasks, return to the section indicated, review the information and repeat the hands-on exercises.

Skills Checklist

Task	Section Where It Is covered
____1. Determine whether a given service situation is covered by the Apple Limited Warranty.	The Apple Limited Warranty
____2. Explain how service providers benefit from the The AppleCare Program.	The AppleCare Program
____3. Describe two situations when you, as a service technician, could promote AppleCare to customers.	The AppleCare Program
____4. State the minimum and maximum number of months that can be covered by one AppleCare policy.	The AppleCare Program
____5. Describe the process for selling an AppleCare policy for old equipment.	The AppleCare Program
____6. Determine whether a given service situation is covered by an AppleCare policy.	The AppleCare Program
____7. Fill out the AppleCare form for a given situation.	Filling out the AppleCare Form
____8. State the number of days within which you should send a copy of completed AppleCare Order Form to AppleCare Registration.	Filling out the AppleCare Form
____9. Describe how the Apple Module Exchange Program works.	The Module Exchange Program
____10. Explain the difference between a "Stock Module" and an "Exchange Module."	The Module Exchange Program
____11. Determine whether a given module meets the criteria for the Module Exchange Program.	The Module Exchange Program

Skills Checklist

Task	Section Where It Is covered
____ 12. State the time limit for sending in a defective module for which you received an Advanced Exchange module	The Service Repair Order Form
____ 13. Explain the purposes of the SRO form.	The Service Repair Order Form
____ 14. Explain when the SRO form must be used.	The Service Repair Order Form
____ 15. Fill out the SRO form for a given situation.	The Service Repair Order Form
____ 16. Explain what you should do with the four copies of the SRO form.	
____ 17. Explain what to do if you provide incorrect or inadequate information on the SRO form and Apple process a warranty transaction as an Out-of-Warranty transaction.	The Service Repair Order Form
____ 18. Describe Apple's standards for packing modules that you are shipping to Apple.	Apple Packing and Shipping Instructions
____ 19. Fill out the Parts Order Form.	Ordering Parts
____ 20. State the minimum dollar amount for each parts order from Apple.	Ordering Parts
____ 21. Describe Apple's restrictions on returning unused service parts.	Ordering Parts

Continue with the next section - Your Administrative Responsiblities: an Overview

Your Administrative Responsibilites:
An Overview

Overview

What are Apple's administrative requirements? What should you do to meet them and when should you do it?

This section will outline your responsibilities. Later in this module, you will learn more details about the service programs involved and the steps for filling out the required forms. This overview is intended to help you understand how it all fits together.

Documenting Service on the SRO

You need to complete the Apple Service Repair Order (SRO) form whenever you perform service that is covered by an Apple warranty program or that involves sending a defective part back to Apple. Follow these steps to ensure that you meet Apple's administrative requirements.

1. **Determine if the product is covered under the Apple Service Program.**

   If the product has an Apple logo, it is serviceable under the Apple Service program.

   For information on servicing products distributed by Apple but not covered under the Apple Service program, see "Service for Non-Apple Products" in the REPAIRING section of the *Apple Service Programs* manual .

2. **Determine if the product is covered by warranty, AppleCare, or an Apple extended repair program.**

   The customer must provide proof of purchase or a copy of the AppleCare contract. Later in this module, you'll learn how to determine coverage by these warranty programs.

3. **Fill out the Service Repair Order (SRO) form with the customer information.**

   The SRO form has been developed to satisfy the administrative requirements of the Apple Service Program. Later in this module, you'll learn how to fill out this form.

Your Administrative Responsibilites:
An Overview

4. Repair the product.

Repair the product according to the instruction you receive throughout this course and the information provided in the Apple Technical Procedures manual. Remember that you must follow ESD precautions when repairing all Apple products.

In the case of a defective module, determine whether it qualifies for the Apple Exchange Program. You'll learn how to do that in this module.

5. Complete the SRO form.

Use the remaining parts of this form to detail the repairs performed and the costs to the customer.

6. Determine your reimbursement from Apple.

If the item is covered by an Apple Warranty, AppleCare agreement, or other special program, check what your reimbursement from Apple will be.

7. Package the defective module.

If the repair involves an exchange module, pack the defective module for shipment, according to Apple's packaging directions. Pack the middle two copies of the SRO form with the module.

8. Ship the defective module and SRO Form to your Apple Support Center.

To locate the address of your Apple Support Center, see "Apple Support Center Locations" in the APPLE SUPPORT section of the *Apple Service Programs* manual. Send the exchange module with the SRO form attached.

When you perform service jobs that do not involve warranty coverage or returning defective parts to Apple, you do not have to fill out the SRO. You may still use the SRO form, however, to document your service. You will need to fill out the Parts Order Form to obtain or replace Apple parts and materials.

Your Administrative Responsibilites:
An Overview

Other Service Jobs

If customers have defective media, such as diskettes or manuals, you may purchase replacements, see Apple Service Price List Binder for prices. Availability will be two to six weeks.

Media Exchange

During your interactions with customers, you will have many opportunities to promote Apple's extended maintenance program, AppleCare. When a customer chooses this service, you will perform two basic tasks:

1. If the coverage is being bought for older equipment, inspect the equipment.

Ordering AppleCare

It is your responsibility to determine whether or not the equipment qualifies for AppleCare coverage.

2. Fill out the AppleCare Order Form.

   This form has been developed to satisfy the administrative requirements of the AppleCare Program. Later in this module, you will learn how to fill it out.

3. Send a copy of the AppleCare Order Form to your Regional Apple Support Center.

Now that you have a general understanding of your responsibilities with regard to these service programs, you're ready to learn what the programs cover, what they exclude and how to complete the required forms.

Continue with the next section - The Apple Limited Warranty.

The Apple Limited Warranty

Overview of the Warranty Program

Apple Computer offers customers a Limited Warranty on Apple products, which begins at the time of purchase. As an Apple technician, you will have to apply the terms and conditions of the Apple Limited Warranty whenever customers bring a product in for servicing. If you know the rules for applying the warranty, you will be able to report accurate warranty information to Apple.

In turn, Apple will pay you or give you credit for modules returned for servicing. Apple will also replace the parts you used out of your inventory to repair a product under warranty.

For the most current information about the Apple Limited Warranty program, you should refer to the *Apple Service Programs manual*. (Remember to insert manual updates as you receive them!)

To learn the basics about the Apple Limited Warranty program, read the following articles which have been produced from the *Apple Service Programs manual*.

The Apple Limited Warranty

Summary Of Apple Warranty Statements

Every product that has the Apple logo carries a Limited Warranty against defects in workmanship. The warranty begins on the day of initial retail purchase. The current warranty statement for hardware appears later in this section.

Note that the copy of the statement in this section is the most recent version. There are many older versions packed with products that were manufactured before this version. Therefore, it is likely that you will see copies of warranty statements that don't look exactly like the examples in this section. To make it all easier, here is a summary of the major statements of Apple Limited Warranties :

- **Warranty** is to be honored by all Level I service centres in the following countries : Australia, New Zealand, Papua New Guinea, Fiji, Vanuatu, and the Solomon Islands. If the authorised service centre is not authorised to sell the product in question then the service centre is required to assist the customer in locating another service centre nearby that is authorised to sell and service that particular product.

- **Products repaired** under warranty, parts and labor are free to the customer. There are no additional charges to the customer, except for transportation charges. Dealers will be reimbursed for parts and labor by Apple as explained in this manual.

- **Burden of proof** that the product is within the warranty period lies with the customer. It is your responsibility to validate that the product is within the warranty period by checking the customer's proof of purchase. Proof of purchase must include date of purchase and the product serial numbers.

- **Modifications,** (other than those listed in this section as acceptable), and damage caused by misuse or accident will void the warranty unless it is clear that there is no relation between the modification and the product failure. An Exchange Module shipped to Apple will be returned to the dealer if it has been modified, altered, or made unfit for the "exchange pool."

- **Exchange modules** used to repair a customer's system are under warranty by Apple for 90-days from the date they are installed in the system.

- **Dead on Arrival (DOA) Service Stock** must be returned to Apple with an SRO. DOA claims for replacement parts do not require a returned part. DOA service module and replacement part claims receive Labor, Parts Credit, and Parts Margin due to the inconvenience caused. DOA "other" parts should be SRMA'd for a free replacement. Since it is not possible to test service inventory when it is received, there is no time limit on claiming DOA service inventory.

- **System software** (including media and documentation) will be replaced upon request if Apple releases updates during the warranty period. Some examples of system software are the System disks containing System software and ProDOS. Note that this does not apply to application software.

The Apple Limited Warranty

Global Warranty

Apple Inc. and Apple Canada have announced a one year global warranty which will cover all customer purchases made in the USA or Canada and then transported outside these countries.

Individuals may purchase Apple equipment overseas and bring it into Australia or an Australian supported country (see below) for their own use. If the equipment fails during the advertised warranty period, they may then approach Apple or one of our authorised service providers to repair the device under the terms of the original warranty.

Australian Supported countries include; NEW ZEALAND, PAPUA-NEW GUINEA, FIJI VANUATU and the SOLOMON ISLANDS

If a customer approaches you to repair a system which was purchased in Canada or the USA, they are required to pay for the repair and make a claim back on those countries.

Therefore, there will be no need to make a warranty claim on Apple Australia. That is, business as usual.

Customer Instructions :

To obtain reimbursement for the complete cost of repairs performed outside of the country of purchase, send Apple Inc or Apple Canada Inc the following information for each in-warranty product for which you have obtained service:

• Your name, address, and day-time phone number
• A letter briefly describing the problem and repair
• The original (foreign) repair bill
• A copy of the U.S. bill of sale bearing the appropriate Apple serial numbers, as proof of date of original purchase
• Proof of payment for the repair (credit card receipt or cash receipt)
• Credit card bill (optional)

Have the customer mail the information to Apple at either of the following address:

Apple Computer Inc   Apple Canada Inc
20525 Mariani Avenue   7495 Birchmount Road
Cupertino CA 95014   Markham, Ontario
U.S.A.   Canada L3R 5G2

Attention: Global Warranty Reimbursement

The claim must be submitted within three (3) months of the repair date. Allow 6 to 8 weeks for processing. The refund will be made in U.S. or Canadian dollars only. If the customer has sent his/her credit card bill (which documents the exchange rate in effect when he/she paid for the repair), this rate will be used when determining his/her reimbursement. Otherwise, Apple will use the exchange rate in force on the day the claim is processed.

The Apple Limited Warranty

Warranty for Apple Products Purchased outside Australia or supported Counties (NZ, PNG, FIJI, Vanuatu & Solomon Islands)

Global warranty covers products purchased in the US and Canada, but requires the customer to pay for the repair and make a claim back on those countries.
Apple policy regarding warranty for products purchased outside the countries already discussed is as follows :

Apple manufactured computers, peripherals, software and other devices not purchased within Australia or one of the countries listed below are **not covered under an Australian warranty** nor are they eligible for coverage under AppleCare.
Apple Australia does not hold exchange modules for all the various international models, nor are Apple resellers within Australia required to hold this extra stock.
However, in the interests of good customer relations, Apple Computer Australia will consider honoring warranty on overseas purchased Apple equipment for direct end users who have imported the Apple equipment themselves ie have not purchased locally from an unauthorised source. Apple's policy in this regard is detailed in the Service Programs Manual.

The Warranty Registration Form

Please encourage your customers to fill out, sign and send their warranty cards in for Apple Warranty Registration. The customer will be eventually forwarded a *Warranty Certificate* which shows which items are under warranty, a *Policy Number* and unique *Client/Customer Number*. The certificate is important in processing warranty claims. A customer should show original purchase receipts or Warranty Certificate when making a Warranty claim.

We encourage resellers to help customers fill out the Warranty Registration form by sending the reseller a policy renewal notice containing customer information when the customer's warranty is about to expire. This enables resellers to take advantage of selling that customer an AppleCare policy.

The Warranty Registration Form also provides Apple with important marketing information and is one way we monitor the performance of Apple equipment and maintain our high quality and reliability standards.

Refer to the sample Registration Form on page 15. Note section 2 requesting Reseller information.

Warranty - by Situation

The table on the following page summarises Apple Warranty for all Apple stock, the duration of Warranty, start dates and required proof of warranty.

Warranty - by Situation

TYPE OF STOCK	DURATION OF WARRANTY	WARRANTY PERIOD START DATE	PROOF OF WARRANTY
Apple owned Dealer Demonstration Stock	**	**	**
Dealer Owned Demo Stock	12 Months	Date of Original Apple Invoice	Copy of: 1. Borg Warner Invoice 2. Borg Warner Leasing Papers 3. Apple Invoice 4. Stamped AppleCare Registration Form 5. Apple "Warranty Plus" Certificate
Dealer Finished Goods - (on the shelf)	12 Months	Date of Original Apple Invoice	1. Copy of Borg Warner Invoice 2. Copy of Apple Invoice
Dealer Service Stock Initial Purchase e.g. Spares Kits	3 Months	Service Invoice Date	1. Copy of Apple Invoice
Repaired - exchange Module	3 Months	SRO Date	1. Copy of original SRO
Customer Owned Systems Initial Purchase of a Finished Good by the Customer	12 Months	Purchase Date from Dealer	Copy of: 1. Dealer Invoice showing S/Ns 2. Stamped AppleCare Registration Form 3. Apple "Warranty Plus" Certificate
Repaired- exchange Module	3 Months	SRO Date	1. Copy of original SRO

** Any failures of Apple-owned Demo Stock should be returned to Apple after speaking to the Apple Purchasing Officer .

Apple Warranty Registration Form

1 Customer Details
(Please complete fully and accurately)

Customer Number: [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

NOTE: If you already have an Apple Computer number, please insert here

Company Name or School Name:

Purchase or Contact Name: [ ][ ][ ][ ]
Mr/Mrs/Miss/Ms

Surname:

Given Name: Initial: [ ]

Department or Title:

Address: _____ Post code: _____

Country: _____ Phone Business: _____ Phone Private: _____

2 Purchase Details
(Remember to attach copy of proof of purchase)

Purchase Date: ___/___/___
Day Month Year

Dealer Name: _____ Suburb: _____

Was form completed by your dealer? Yes ☐ No ☐   I would like information about On-Site Service. Yes ☐ No ☐

3 Product Details

List code number and description as indicated opposite.
*Please note that products marked with asterisk must show serial number.

CODE NO	DESCRIPTION	SERIAL NO.
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPLE SOFTWARE ONLY. PLEASE SPECIFY: _____

4 Marketing Information

1. I plan to use my Apple product(s) mainly for:
(Circle appropriate box/es)

- A Home/Family
- B Business
- C Education/School
- D Scientific/Industrial

2. What three features are most important to you?
(Circle three boxes only)

- A Graphics
- B Colour Option
- E Peripherals
- F Price
- J Service
- K Portability
- M Available Software
- N Compatibility
- O Power/Speed
- P Ease of Use
- Q User Support

3. What three uses are most important to you?
(Circle three boxes only)

- A Personal Finance
- B Computer Education
- C Database
- E Entertainment
- F Accounting
- G Spreadsheets
- H Word Processing
- I Inventory
- J Engineering
- M Desktop Publishing
- N CAD/CAM
- O Communications/Networking

4. What influenced you most to buy an Apple product?
(Circle two if necessary)

- A Apple Dealer
- B Advertising
- C Friend
- D Editorial
- F School/Univ
- G Trade Show/Exhibition
- H Consultant
- I Brochure

5. What is your age group?

- A 18 or under
- B 19-25
- C 26-35
- D 36-45
- E over 45

6. If for business use, number of employees.

- A Fewer than 10
- B 10-50
- C 51-100
- D 100-500
- E Over 500

7. Which industry do you work in?
(Circle one box only)

- A Professional
- B Legal
- C Consulting
- D Construction
- E Real Estate
- F Hospitality/Service
- G Banking/Finance
- H Wholesale or Retail
- I Manufacturing
- J Transportation
- K Government
- L Insurance
- M Public Administration
- N Other: _____

2.7 Guidelines to Warranty and AppleCare Exclusions

The Apple 12month Limited Warranty is intended to cover defects in material and workmanship in Apple hardware and software. Several situations may arise which are not covered by the Apple warranty. These are listed below.

Note: All the situations which void the Apple Limited Warranty also void AppleCare coverage.

Warranty Expired

If an Apple product is out of the term of the Apple Limited Warranty, repairs are no longer covered or reimbursed under the standard warranty procedure. See the LIMITED WARRANTY section for detailed information on the Apple Limited Warranty.

Pre-Sales Check Out

Sometimes resellers perform adjustments that are not covered by warranty. An example is adjusting the speed on an out-of-the-box disk drive. This situation is not covered or reimbursed under warranty if the disk speed is within the published specification range (even though it is not precisely at the optimal speed).

No Trouble Found

The customer claims there is a problem with the system, but it cannot be repeated.

The customer should configure his system and try to duplicate the failure at his reseller's service center. The system is defined as functional if it passes diagnostics and will run known, good software. If the programs run as they should, then the system is functional.

⌘ excerpt from "Apple Service Programs manual"

For suspected intermittent problems, run the appropriate diagnostic test overnight on the system. However, if you run the test overnight and still find no problem, then there can be no warranty claim for your time. You should decide in advance whether you will absorb this cost or charge the customer. If you plan to charge customers, be sure they know about the potential charge **in advance of your running the test.** Apple suggests that you make your customers aware of your No Trouble Found policy by referring to a sign, poster, or form that explains your policy before you begin the diagnostic procedures.

In general, **if no defect is found then there is no basis for a warranty claim.** However, if you feel that a warranty reimbursement is justified in a given situation, discuss it with your regional Technical Support Engineer or Technical Customer Service Manager.

Unauthorized Modifications

All unauthorized modifications will void the Apple Limited Warranty unless it is clear that there is no relation between the modification and the product failure. Any modification which permanently alters the basic module and makes it unfit for the module "exchange pool" will void the Apple warranty. For example, attempts to rework the power supply at the component level will void the warranty on an Apple product. For a list of modifications which are considered acceptable and will not void warranty, refer to the LIMITED WARRANTY section in this manual.

Misuse And Abuse

The warranty does not apply if the Apple product has been damaged by accident, abuse, misuse, or misapplication. The end user should treat his Apple computer products as semi-delicate pieces of instrumentation. Any extraordinary wear and tear, such as a foreign substance (glue, coke, oil, etc.) in the subassembly will void the warranty.

Operator Errors

Examples of "operator errors" include loading programs from the wrong drive, loading a program too large for memory, running untested application software with "bugs," or not following directions in the appropriate manual.

This class of problem falls into the "user training" category and is not covered under warranty. At the time of purchase you should show the customer: 1) how to configure the system, and 2) how to operate the Apple with his particular application software. This should be part of the normal point-of-sale service you provide for your customers.

Blown Or Cracked ICs

If the ICs look physically burned (i.e. you can see the damage) the damage is the result of misuse of the product. Possible explanations are: 1) improper alignment of the pin connector on the disk interface cable, and 2) boards or cards that were connected or disconnected with the power on. **These situations are not covered under warranty**. A warning sheet enclosed with each disk drive as well as the appropriate manuals clearly state the precautions the customer should take when working with this equipment. And remember, if modules are sent to Apple with missing or inappropriate-ICs, warranty claims will be voided and will be returned to the reseller.

Non-Apple Peripherals

Common customer errors such as improper connectors, loose peripheral connections, faulty TV sets, etc., are not covered under the Apple Limited Warranty. Non-compatible peripherals can also void the warranty. We recommend that you remove all non-Apple peripherals and proceed through the normal diagnostics. If there is no trouble found, follow the guidelines above.

é_® excerpt from "Apple Service Programs manual"

It Works In The Shop, But Not In The Office

This may be a repeat of the "no trouble found" situation where there is indeed a problem. Most often the problem is not within the Apple system but is due to a "noisy" power line, improper grounding, or some other external electrical problem.

We recommend that the customer switch to a different circuit—one with fewer users. If this does not solve the problem then metering the circuit, or in extreme cases, using an isolator will be necessary. Since the problem is external to the Apple system, it is not covered by the Apple Service program or any Apple Warranties.

Acceptable Modifications

The following is the exclusive list of modifications which are considered acceptable and will not void the warranty:

.

1. Mac II and Mac SE Third Party Add-ons (Refer to the Mac II and Mac SE Third Party Add-ons Product Notice for more information.)

2. Cutting of the bowtie at X6 on the IIe Enhanced Logic Board

3. Apple's cut modification to the back of the IIe Enhanced Logic Board near F3

Continue with the next section - Exercise: Identifying Products Covered by Apple Limited Warranty.

Exercise: Identifying Products Covered by the Limited Warranty

Directions

For each Case below, check **Yes** or **No** to indicate whether or not servicing will be covered under the Apple Limited Warranty.

Case 1

Sam Jackson, who bought an Apple IIGS two months ago, has returned his system to your Apple Service Centre. You determine that the problem is with the keyboard mechanical assembly. When the shift key is pressed, there is no shift function. Everything else about the keyboard is normal.

Is the servicing covered under warranty?

Yes _____   **No** _____

Case 2

Mary Shaffer has returned her Apple IIe system to your dealership where she purchased it a month ago. She tells you that many keys repeat and that certain keys just do not work. When they are struck, nothing is registered on the video display.

When you examine the computer, you notice that there is a great deal of oil on the keyboard. In fact, you determine that this is causing the problem.

Yes _____   **No** _____

Case 3

School district teacher Betty Simmons has returned one of the school's Apple IIe systems to your Apple Service Centre where it was purchased a month ago. She complains that the printer is substituting characters.

You suspect the printer interface card. It turns out that the original Apple printer interface card has been replaced with a non-Apple printer interface card that is causing the printer to malfunction.

Is the servicing covered under warranty?

Yes _____   **No** _____

Exercise: Identifying Products
Covered by the Limited Warranty

Case 4   Tim Smith, who recently moved from the Canada, has brought in his Macintosh Plus and Macintosh 800K External Drive. He purchased the system two months ago in Canada and reports that he cannot boot disks in the external drive. After checking the system, you find that there is a problem with the drive mechanical assembly that could not have been caused by user abuse.

Is the servicing covered under warranty?

Yes____   **No** ____

Case 5   Steve Turner, has returned his new Macintosh IIci to your shop, from which he bought a system recently. The trouble turns out to be with the Video Interface Card. When you examine the card closely, you notice that a RAM chip is burn fractured and inserted incorrectly. He has carried out a RAM upgrade himself. When you test the card with his RAM upgrade removed you discover the card is not functioning correctly.

When Steve asks if the service repairs can be done under warranty, you tell him that the IC fracture and card damage was caused by his own installation error and is not covered.

Should the servicing be covered under warranty?

Yes____   **No** ____

Case 6   Fifteen months ago, Linda Benson bought an Apple IIe "AppleWorks" word processor diskette and accompanying manual from your dealership. Today, she has returned the diskette, saying it has been damaged by spilled coffee and will no longer boot.

Can her software be replaced under warranty?

Yes____   **No** ____

Exercise: Identifying Products
Covered by the Limited Warranty

Case 7   George Williams has brought in an Apple IIe purchased fourteen months ago. You
have isolated the problem to the logic board. On examining the board, you notice
that some of the solder traces have been scraped. As a result, the game paddles
will not function.

Is the servicing covered under warranty?

Yes ____   **No** ____

Compare your answers with those on the next page.

Exercise: Identifying Products Covered by the Limited Warranty (Answers)

Directions

Compare your answers with those given below.

Case 1 **Yes** - Servicing of Sam's keyboard will be covered under the Apple Limited Warranty. The faulty keyboard mechanical assembly shows no sign of being abused or damaged by the customer.

Case 2 **No** - Although Mary's Apple IIe system is still under the Apple Limited Warranty, any servicing costs will not be covered. Oil on the keyboard is an example of customer abuse that voids the warranty.

Case 3 **No** - Since a non-Apple product is causing the system to malfunction, the Apple Limited Warranty does not apply.

Case 4 **Yes & No** - The repair is covered under the **Apple Global Warranty** scheme, but Tim will need to pay your resellership as for an out of warranty repair and claim for repair costs in the country of purchase. Apple Limited Warranty is valid for equipment purchased in Australia, New Zealand, Fiji, Papua New Guinea, Vanuatu and the Solomon Islands..

Case 5 **No** Steve intalled the RAM himself, damaging the Video Interface Card.

Case 6 **No** - The Warranty period has expired and in any case, Application Software is not covered under the Apple Limited Warranty. (See Page 11, *Summary of Apple Warranty Statements*).

Case 7 **NO** - The servicing is not covered under the Apple Limited Warranty for two reasons. First, the expiration date of the warranty is past. Also, the motherboard has been tampered with, which would have voided the warranty in any case.

If you missed any of these items, spend more time studying "The Apple Limited Warranty" and "Guidelines to Warranty and AppleCare Exclusions.".

Directions **Continue with the next section - The AppleCare Program.**

The AppleCare Program

What Is AppleCare

As an Apple service provider, you can help your customers take advantage of the excellent service coverage available for Apple owners—the AppleCare Service Plan.

AppleCare is an extended maintenance agreement that gives your customers a way to protect their Apple products **at an annual cost that is less than one typical repair charge**. AppleCare covers parts and reimbursement on all Apple personal computer systems, including Apple-manufactured peripheral devices and interface cards.

Nobody likes to present a customer with a staggering repair bill. With AppleCare, you and your customers will have peace of mind knowing they are shielded from unexpected service costs for up to 36 months.

Advantages of AppleCare

AppleCare is the best service coverage bargain for dealers. In fact, there is no other Apple product that delivers a higher dealer margin than AppleCare. Your dealership earns a margin of 50% on each AppleCare contract when it is sold, and you receive a generous reimbursement for reimbursement on every repair you make on products covered by AppleCare. The dealer is free to set the retail prices for AppleCare. This is really a **risk-free** way for your service operation to generate income and become one of the most profitable areas of your dealership. Experienced service technicians know that **service is a business**, and a very profitable business, at that.

Selling AppleCare

The service situation gives the technician excellent opportunities to sell AppleCare, for example:

*   **When you have just returned the client's repaired system**
    — a repair he's had to pay for! An expensive repair will very often change a person's mind about purchasing the AppleCare Service Plan.

*   **When a client comes to you for technical advice or information—**
    showing he wants to know more about his computer. You can introduce the subject of AppleCare by referring to the customer's obvious interest in his computer's capabilities and its future.

Apple can send you **free marketing and promotional materials** that will help you show off AppleCare advantages to your customers. Apple even sends renewal notices to your customers reminding them to return to your store to renew their coverage.

The AppleCare Program

AppleCare for Older Equipment

Your business's sales force usually sells AppleCare for new systems, but you will often sell AppleCare for equipment on which the Apple Limited Warranty period has expired. **Older equipment may be covered under an AppleCare contract at the same low prices as brand new systems.** This makes AppleCare an even better value for customers with out-of-warranty systems.

Before you can sell a policy for older equipment, you must inspect the equipment to make sure it is in good condition. Whether or not older equipment qualifies for AppleCare is a matter for your expert judgment. If the equipment appears to function properly and to have been kindly treated, you may go ahead and cover it under AppleCare. (You may also charge the client for the inspection, if you wish.)

Each authorized Apple dealer is free to set retail prices for the AppleCare Service Plan. For your convenience, **suggested** retail prices are listed inside the front cover of packets of AppleCare Service Plan order forms.

AppleCare Price Sheet

Dealer prices for AppleCare (the amount Apple will invoice the dealer) are found in the *Apple Service Programs* binder and on AppleLink. You will be sent price updates whenever these prices change. Replace the old dealer price pages in your *Apple Service Price List* binder with the updated sheets when you get them.

AppleCare Service Plan order forms, preprinted with consecutive order form numbers, are supplied to your dealership/organization at no charge through your Apple Reseller Services Representative.

Details About AppleCare

You can always locate the most current information about AppleCare in the *Apple Service Programs* binder.

To learn about this program, read the following sections which were reproduced from that manual.

APPLECARE SERVICE PLAN

Description

AppleCare is an extended maintenance agreement. It provides your customers with an excellent means to protect their Apple system and peripheral products at an annual cost that is less than the cost of a typical single repair. In addition, your customers will have peace of mind knowing they are covered from unexpected repair costs for up to 36 months.

AppleCare is best sold as a package with the Apple system and peripherals products. This is an integral part of selling the "Apple Solution." AppleCare has proven to be a highly profitable product for resellers due to its generous reseller margin, as well as continuous profit earned from repairs made on AppleCare covered products. Additional revenue is derived because Apple sends your customers renewal letters, encouraging them to return to your business to renew their AppleCare coverage.

Only Authorized Apple Resellers may sell AppleCare for the Apple products they sell and service.

You may order AppleCare literature from your local Apple Reseller Services. Listed below is the available material:

1. "Protect your Apple from the Unexpected" AppleCare
    Registration Forms LS005
2. Carry in Service - List LS0014
3. Carbonated AppleCare Service OrderPlan LS0010
4. Carbonated AppleCare Supplementary forms LS0011
5. "How to take care of your Apple" brochure LS0012
6. "Three New Ways" brochure LS0013

After you sell an AppleCare service agreement, mail the Apple copy of the Order Form within 14 days to your

The AppleCare Administrator
Apple Computer Australia Pty Ltd
16 Rodborough Road
Frenchs Forest NSW 2086
(See "How to Complete the AppleCare Registration Form")

Apple will send a Confirmation Certificate to your customer to verify their AppleCare coverage. In the meantime, however, if your client has a problem with his AppleCare covered equipment, he can have repairs carried out using a copy of his AppleCare Service Plan Order (SPO) form as proof of coverage. This must only be used until his Confirmation Certificate has been received.

To claim back from Apple, however, you will need to include a copy of the SPO form preferably, or if not practicable, include the SPO number on the SRO. This will be processed providing Apple has previously received Apple's copy of the sale of the contract.

For resellers securing your own on-site service agreements but using AppleCare as a base, this certificate can be directed to you just by ticking the appropriate box on the SPO form. Prior to the expiration of the AppleCare coverage, Apple will send your client notification of the service agreement status and will refer them back to your business for renewal of AppleCare coverage or otherwise they can mail their renewal directly to Apple, bearing in mind that you will still receive your margin.

At the same time that Apple sends out the renewals to your clients, we also send out a listing to you of all your clients we mailed, with their name and address included.

Coverage

AppleCare will only pay for remedial repairs, including parts and labor. Effective April 15, 1987, there is a two month minimum purchase requirement on all AppleCare service agreements. Service agreements may be purchased for up to 36 months.

AppleCare coverage includes the following products:

1. Miscellaneous Products

- Keyboard/Mouse

  When AppleCare is purchased for any Apple CPU, coverage will include any Apple keyboard and Apple mouse, regardless of which keyboard is purchased or used with the system.

- Memory Expansion Card/EtherTalk™

  The Apple IIe, Apple IIc, Apple IIGS Memory Expansion Cards, and the Apple EtherTalk card, are **not** included in any system coverage. AppleCare must be purchased separately for these products. For part numbers and prices for the Memory Expansion Cards, or the Apple EtherTalk card, please see the price pages.

- Internal Mass Storage Devices
  The addition of internal mass storage devices, other than those purchased as factory installed, must have separate AppleCare coverage. They are **not** included in the system coverage **nor** in the upgraded system coverage.

- Apple II Video Overlay Card
  This card is not included in any system coverage. AppleCare must be purchased separately for this product. Refer to the Service Price List binders for part number and pricing information.

- Cables/RAM

  Interconnecting cables and Apple RAM are covered by AppleCare, providing the hardware they are associated with are covered.

Exclusions

Coverage does **not** include:

- Maintenance of equipment not included in the AppleCare agreement, ie "Cosmetic" parts such as plastic casings and Bezels, etc.

- Maintenance of non-Apple equipment used in place of equipment that is covered by AppleCare (e.g. non-Apple keyboards or memory upgrades).

- Repairs required for reasons other than defects in materials or workmanship. For example, preventative maintenance, misuse, accidents, non-Apple modifications or upgrades.

- Corrective updates to Apple system software.

- Inspection and testing by the reseller resulting in "no trouble found." You will not be reimbursed for "no trouble found" claims. Whether or not you elect to charge the client for the service is up to you.

- Replacement or repair of consumable products such as LaserWriter toner cartridges, printer ribbons, tape cartridges, et cetera.

- Maintenance of equipment that has had the serial numbers removed or defaced.

- Refurbishment: refurbishment is considered routine maintenance and is excluded under No. 3. "Service Excluded" of the AppleCare terms and conditions. See also, LaserWriter Policy under the Service Policy tab. For additional information on exclusions, see the back of the AppleCare agreement for terms and conditions as they apply to your client.

Reimbursement And Compensation

You will be reimbursed by Apple for performing remedial repairs on Apple products covered by AppleCare. Apple reimburses Authorized Service Resellers for labour (per product), module exchanges, replacement part repairs, and specified adjustments only. Reimbursement rates vary according to repair and product type. See "Warranty and AppleCare Repairs", and the PRICES section to determine the reseller reimbursement for each product under AppleCare.

The burden of proof that the product is within the Apple 12 month Warranty or AppleCare period lies with the client. It is your responsibility to validate that the product is within the AppleCare term. To do so, check the associated product serial number(s) on the client's Confirmation Certificate. If there is no paperwork available you may phone the AppleCare Administrators on (02) 452-8027 for confirmation. The serial number, client name and address will be required, to do a search on the Apple system.

To receive your AppleCare reimbursement, submit an SRO claim just as you would for the original 12 month warranty. When filing a claim, be sure to use the correct AppleCare Contract Number and the correct product serial number. **Your claim and subsequent reimbursement will not be met if this required information is missing or incorrect.**

Acceptable methods of paying for AppleCare

There are different ways AppleCare can now be paid. They are :

1. **Client pays Apple Direct**

   The client sends his AppleCare form directly to Apple with his cheque/credit card no for the recommended retail price (RRP) of AppleCare Apple will process the form and credit the reseller for your 50% margin.

   The reseller may also send the form in for the client and he attaches the client's cheque/credit card made out in Apple's name. Apple will process the form and credit the reseller for his 50% margin.

2. How the Reseller Can Pay Apple for AppleCare

(a) <u>By Cheque</u>

The reseller sends the form to Apple and attaches his cheque **for 50% of the RRP** which is Apple's cost for AppleCare. The reseller may include several contracts for different clients under the one cheque but the cheque must be for reseller cost only i.e. 50% of the RRP. Apple can no longer accept one reseller cheque for several contracts at the RRP cost.

(b) <u>Reseller's Account to be Debited</u>

The reseller sends the form to Apple and **ticks the appropriate box on the form** advising that he would like his account debited for the reseller cost of AppleCare. Apple must have your authority before we can debit your account. Apple will process the form and send the reseller a debit note for each AppleCare contract. These will appear on the resellers monthly statement. **This option is not available to reseller's who are on credit hold at the time the form is received by Apple or do not have an established credit facility.** If a reseller is on credit hold or does not have a credit facility, only option 2 (a) is available to him.

If an AppleCare form is sent to Apple without payment and the Resellers is on credit hold, the form will be sent back to the reseller within 24 hours. If the AppleCare has not been returned to Apple with a cheque within 7 days, the Apple Account Manager and Financial Services Manager will be notified and asked to follow this up with the Reseller.

AppleCare will be debited against the **Apple Reseller account only** and cannot be debited to the Bridge Wholesale Acceptance Corp account.

(c) <u>AppleCare sent via AppleLink</u>

The reseller sends a copy of the AppleCare Registration form via AppleLink. The resellers account will automatically be debited for the reseller cost of AppleCare. NOTE: This option is only available if the reseller is **not** on credit hold at the time of receipt. Please also note, that Apple must receive the original paperwork within 14 days of receipt of the AppleLink. If this is not received within this timeframe the AppleCare contract will be cancelled.

It is important to note that in all the above cases Apple must receive the AppleCare Registration forms within 14 days from the date of sale. Apple will not be obligated in accepting an AppleCareRegistration form where thedate signed is more than 14 days old.

Reseller Benefits

Generous profit margin is earned on each AppleCare sale. You receive a margin of 50 percent on each AppleCare sale. This is a significant gain on existing sales.

Continuous profits are earned from repairs performed on AppleCare covered hardware. You receive full 3 - tier warranty reimbursement on all AppleCare repairs.

Client demand for AppleCare is demonstrated by your clients insistence, and continual support, of the AppleCare product line.

No inventory investment is required of resellers. The only materials you manage are the AppleCare Registration Forms, price cards and brochures that you distribute to your clients, and these are no charge items available thr your Reseller services specialist.

AppleCare is promoted through point-of-sale materials, AppleCare flyers and Price Cards and direct mailings to your clients.

Volume discounts

The goals of this program are to increase sales by making it easier for you to sell AppleCare to high-volume purchasers and to increase AppleCare penetration by making AppleCare more cost-effective for customers with many systems.

The AppleCare Volume Discount will offer customers discounts based on the number of systems covered.

Description
AppleCare Volume Discounts will be based on the number of products that are the same on any one contract:

No. of same Products Covered Under One Contract					
<5	5-9	10-24	25-49	50-99	100+
0%	5%	10%	15%	20%	25%

If one contract has 6 Macintosh Plus' and 2 ImageWriter II printers, the Macintosh Plus' will receive the 5% discount and the ImageWriter printers will be at the regular price.

The volume discount will only be available for equipment with the same AppleCare Code No

on the one contract and also for the same period e.g. 6 Macintosh Plus' for 12 months would receive the 5% discount but if 4 Plus' were for 12 months and 2 were for 10 months, there would be no discount.

Volume Discount is available to contracts with a minimum length of 12 months and customers will receive a dollar benefit for purchasing upfront.

Description
AppleCare Multiple Year will be available for three years maximum. The customer would receive a 5% discount for each year purchased in advance. The following shows how it will work:

	One Year	Two Years +	Three Years +
Discount	0%	5%	10%

Note: The discount would come from the total AppleCare payment, eg if the customer owned a Macintosh Plus and purchased two years AppleCare, he would pay $204 x 2 = $408 less 5% ($20.40) = $387.60. If he takes it out for three years the equation would read: $204 x 3 = $612.00 less 10% ($61.20) = $550.80.

This program is slightly different from the AppleCare Purchase with Original Sale plan where the customer receives an extra 5% discount for purchasing AppleCare at the time of the original sale of the equipment.

If the customer qualifies for the Volume Discount as well, the equation would be worked as:

6 Macintosh Plus (@ $204.00 each per yr.)	$1,224.00
Customer purchases 3 years at once	x3
	= $3,672.00
Less: 15% discount (10% for multiple year purchase and 5% for Volume Discount)	550.80
	= $3,121.20
The undiscounted RRP would be:	$3,672.00
Less: discounted price	$3,121.20
Total Discount:	$550.80

AppleCare Purchase with Original Equipment

This program will entice customers to purchase AppleCare at the time they purchase their equipment.

Description

AppleCare Purchase with Original Sale will be offered to customers at the time they purchase their new system. There will be a 5% discount per year for purchasing AppleCare in advance. The customer will buy now at today's prices and will be covered for the term of the contract even if prices go up during their warranty period

	Warranty	1 Year +	2 Years +	3 Years +
Discount	N/A	5%	10%	15%

The customers can purchase up to three years maintenance cover up front so that they would end up with one year warranty and three years AppleCare.

For example, if the customer purchases a Macintosh Plus they will have one year's warranty. If they purchase one year's AppleCare on this computer at the time of the sale, they will receive a 5% discount on AppleCare.

AppleCare for Mac Plus for one year	$204.00
Less: 5% Discount	$ 10.20
• amount due:	$193.80

If the customer purchases 2 years AppleCare at the time of the sale, they will receive a 10% discount and if they purchase 3 years AppleCare they will receive a 15% discount.

AppleCare Collateral Available

- Volume Discount Flyer
  This will be a flyer describing the discounts to customers. It will be sent out with the AppleCare Renewal mailings. Supplies will also be available for resellers

- Service Plan Order forms & Supplementary Sheets
  Service Plan Order forms and Supplementary Sheets will be used by resellers to

create a new AppleCare contract, to advise Apple of a change of address of a client and a change of ownership. The number on the Service Plan Order will be your clients temporary number until they receive their AppleCare Confirmation Certificate.

- How To Take Care of Your Apple brochure
  This will be used to promote AppleCare to customers and alert them to the fact that discounts are available. A copy of the brochure will be sent out with the Warranty Certificates and bundles will also be available for Resellers free of charge.

- Protect your Apple from the Unexpected
  This application form will be available for resellers to hand out to theircustomers.

- Posters
  High quality posters are available for the resellers to use in their dealership.

- AppleCare Point of Sale Dispensers.
  These will be used to hold the "Protect your Apple from theUnexpected" form, the price cards and the "How to take care of your computer" brochure.

- AppleCare Price Cards
  These cards go with the "Protect Your Apple....."

How to Use the AppleCare Discount Template

- Insert the number of same products in column "E"

- Insert the number of months of the contract in "column F"

- If the contract is a Purchase with Original Sale contract insert "1" in column "G" otherwise the template will automatically work out as a Multi Year contract

- The template works out total RRP cost, the discount due and the total discounted price

Client Benefits

The following benefits may be used as purchase incentives to convince a client when selling AppleCare:

Elimination of unexpected repair expenses. AppleCare protects your customers against unexpected repair expenses. The coverage allows them to pay one up-front price for all remedial repairs on covered equipment. Clients achieve peace of mind and confidence knowing that both AppleCare and their resellers are backed by Apple.

Annual cost is less than a typical single repair. AppleCare is one of the lowest cost service programs in the industry. Not only is AppleCare an excellent value when compared to the high potential cost of repairs, it also provides a hedge against the rising cost of repairs.

Unlimited number of repairs. Regardless of how often your client's Apple fails under normal circumstances, it is still covered under AppleCare.

Nationwide coverage. Your clients are assured that their AppleCare coverage will be honored at over 150 Apple Authorised Service Centers within the Australasian area–added protection should they relocate.

Quality service. The Apple Authorised Reseller has qualified customer service specialists who are trained by Apple to provide the highest quality service.

Fast Service. Modular replacement repair results in faster trouble-shooting and repair.

Aids to Selling AppleCare

Prompt sales people and clients to ask about AppleCare. Provide a section listing the AppleCare coverage option on your sales invoice or sales worksheet as a prompter for both Sales persons and clients to ask about AppleCare. To reinforce the importance of AppleCare coverage, provide a place on the invoice for the client to initial if declining the purchase of AppleCare. This concept is similar to a rental car agreement, where you initial that you decline to purchase additional insurance coverage. The statement might read, "My reseller has explained the benefits of AppleCare, however I choose not to purchase AppleCare at this time.

Use the AppleCare related materials. Use the AppleCare related materials available: "How to take care of your computer" brochure, the AppleCare Registration Forms and Price Cards. Place these materials in their Take One stands in an area near the hardware to create customer curiosity regarding the AppleCare program.

Include AppleCare in system sales. Bundle AppleCare coverage with the sale of the Apple system and peripherals. This provides for easier sales and an increased margin.

Substantiate your repair claims. Show clients old repair bills substantiating your claims that repairs can cost more than an AppleCare agreement.

AppleCare covers out of warranty equipment.

Tell current clients who have out-of-warranty systems that they can add AppleCare coverage to their system at any time. However, the equipment they desire AppleCare coverage for must be reseller inspected prior to the purchase of the AppleCare service agreement.

AppleCare Client and Contract Numbers

AppleCare uses a Client Number and a contract number. These numbers will appear on the Warranty and AppleCare Confirmation Certificates. A client number is allocated to one client, say XYZ Graphic Company. However, XYZ may have purchased 20 different Apple products all at different times so they will have 20 different contract numbers. This same theory applies to AppleCare as well.

When putting a claim through on an SRO you will need to put the Warranty or AppleCare **contract** number. However, when notifying Apple of a change of address we will require the **Client** Number.

When your clients come in to renew their AppleCare service agreement at the end of the term, the only information the reseller needs is the AppleCare Client Number, the expiring Contract Number and the equipment they want to renew. Clients who already own Apple equipment and have either filled out their Warranty form or purchased AppleCare can reference these number on all future purchases, renewals, and repair claims.

Items to Check before accepting AppleCare Contract

1. Has the equipment been out of warranty or AppleCare contracts longer than 60 days?

    If it has, Apple will need one of your service technicians/engineers to sign on the bottom of the AppleCare Service Plan Order stating that the equipment listed is in good working order. If this section has not been signed, the form will be returned to you asking for the equipment to be checked and the correct section to be signed.

    If the equipment has been out of contract less than 60 days, Apple will accept the Service Plan Order form without this signature.

Sample AppleCare Form

✂ PLEASE CUT ALONG DOTTED RULE

AppleCare Registration Form

*Your details
(Please complete
fully and
accurately.)*

Client Number: ☐☐☐☐☐☐ ◀ Note: If you have an Apple Client number and/or a Contract number, please insert here ▶ Expiring Contract Number: ☐☐☐☐☐☐

Purchase or Contact Name: Mr☐ Mrs☐ Miss☐ Ms☐ Other_____ Surname: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Given Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Initial: ☐

Department or Title: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company Name or School: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ST/LD —

Address: _____

— FIRST FOLD

_____ P/Code: _____

Country: _____   Phone Business: _____   Phone Private: _____

*Authorised Apple
Reseller information*

Reseller Name: _____ Suburb: _____

Reseller Number: _____ Salesperson Name: _____ Contract Start Date: _____

Equipment purchase date:*_____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: _____ Date: _____

Reseller Name: _____

Equipment covered

AppleCare Part No.	Product Description	Product Serial Nos.	No. of Months	Cost per Month	Total cost (Undiscounted)

OKD/LD —

— SECOND FOLD

(AppleCare part no., product descriptions and monthly pricing are shown on Price Card.)

Total Amount: $
Less Discount (if applicable): $
AMOUNT DUE: $

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ Date _____
Client Signature

Payment authority

I have enclosed my cheque for $_____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: __/__/__ Card No: _____

Cardholder Name: _____ Cardholder Signature: X _____

2. *Are the Serial Numbers correct?*
   Ensure that the serial numbers are correct. This saves a lot of correspondence and anxiety for your client if the correct serial numbers are included at the start of the contract.

How to complete the AppleCare Registration Form

Each Apple hardware component to be covered must be listed on the AppleCare Service Plan Order form. Each product has its own AppleCare product number. AppleCare product numbers and suggested retail prices are listed on:

* The AppleCare price card
* The Apple Authorised Pricing Binder
* The Service Price List Binder

The Initial Registration Form (Refer to Attached Page)

The initial AppleCare "Carry-In Service Plan" Agreement **must be for 12 months minimum - 36 months maximum.** All equipment checked will be covered until the expiration date recorded. Additional peripherals purchased after the original agreement can be added to existing coverage by pro-rating (months only) on a new registration form so that all expiration dates are the same.

Missing data or badly filled forms will be returned to the sender and the agreement will be considered as not being complete until re-submitted.

* Fill out **Client and Reseller** sections completely and accurately. Fill in Client No if Client has had a Warranty or AppleCare Agreement previously and the Expiring Contract Number.

* **Start Date.** Ensure you insert the start date required. If AppleCare is purchased when the equipment is purchased, the AppleCare start date is the day after the expiration of the 12 month warranty. In this case, please send the warranty form in with the AppleCare Service Plan Order form.

* Check **System Coverage** if this is a new agreement. If the equipment has been out of either Warranty or AppleCare cover for more than sixty days, we need you to state that your technician has tested the equipment and that it is in good working order. **There is a section on the bottom of the SPO form for your technician to sign.**

* Enter the correct **AppleCare Code Numbers** for the recorded products to be covered.

- Enter the **Product Descriptions** for the Main System and all peripherals to be covered on this agreement as well as the associated **serial numbers.**

- Enter the **price** for the AppleCare product **per month.**

- This being the initial agreement the number of months **must** be 12 months minimum - 36 months maximum. The only instance when an AppleCare Agreement can be for less than 12 months is when the client wishes to consolidate two or more contracts into one AppleCare Agreement so that they have the same expiry date.

- Multiply the number of months by the price to arrive at the totals.

- Add up Total Cost column + sub-totals on Supplementary Sheets and insert this figure in the "Totals (undiscounted)" column.

- Work out discounts due on the AppleCare template and include the total in the "Discount" section.

  - Take the discount total away from the Total (Undiscounted) to work out the total due.

  - Your **client must sign and date** the agreement.

  - Send Apple's copy of the form within 14 days to:

  AppleCare Administrator
  Locked Bag 11
  FRENCHS FOREST NSW 2086

- An AppleCare Agreement certificate will be sent directly to your client as proof of acceptance and registration by Apple. Your client should receive this within six weeks after receipt by Apple. The certificate must be retained for presentation in the event of a service claim. The Service Plan Order form can be used as a temporary number until this certificate is received by the customer.

To Add peripherals to an existing AppleCare "Carry-In Service" Agreement

Repeat steps as above. However, you will need to calculate the number of months between the new Agreement and when the existing contract is due to expire and multiply by the cost per month to bring both contracts in line.

Payment of AppleCare can be sent in with the form either in the form of a cheque or a credit card or your account can be debited for the cost of AppleCare. However, Apple's normal credit terms will apply. See section on AppleCare payment.

Additional Information

• If your client has a problem with their covered equipment before they receive their Confirmation Certificate, they can use the SPO form as a temporary proof of coverage. However, Apple must have already received their copy of the sale before this number can be used. You may also phone the AppleCare Administrators on (02) 452-8027 and ask for the AppleCare contract number. You will need to provide the serial number, the client name and address. The contract number given to you will need to be put on the SRO where it asks for the Agreement No.

• The Service Plan Order form must be received by Apple within 14 days after the sale. Apple will not accept a form after 14 days have passed. So to avoid any inconvenience to your clients ensure that this is sent straight to Apple after the contract has been sold.

• If you need to list more equipment than will fit on one form, please use the Supplement Order Pad.

AppleCare sent via AppleLink

Resellers now have the facility of sending AppleCare Registrations via AppleLink. The form can be found in the Australia Icon, in the General Information Folder, in the Service Administration Folder. Instructions on how to send the registrations are in "Read First - AppleCare" and the Registration form itself is aptly named "AppleCare Registration Form".

Two important details to note are:

1. Original Paperwork

Apple will need to receive the original paperwork as well. This **must** be received by Apple within 14 days from receipt of the original AppleLink Registration form. If the original paperwork is not received within this timeframe, Apple will automatically cancel the AppleCare contract and claim back any monies given for repairs during that time. The reason for being so strict is, that Apple must have the original Agreement signed by the client, who agrees to the Terms and Conditions of the contract for legal reasons.

2. Payment of AppleCare

By returning this AppleCare Registration form, Apple will automatically debit your Apple Reseller Account for the cost of RRP AppleCare less your 50% margin. Unfortunately, you cannot pay by cheque or credit card when using this method.

How to Fill out the AppleCare Form on AppleLink

1. Open the Memo "AppleCare Registration Form"
2. Under Edit - "Select All"
3. Under Edit - "Copy"
4. Under file - "Write a New Memo"
5. Under Edit - "Paste"
6. Complete the form with as much detail as possible. However, you must ensure that the question "Has the client signed and agreed to the AppleCare Terms and Conditions on the AppleCare form" been filled in?
7. Fill out the Certificate of Good Order for equipment out of either Warranty or AppleCare contracts longer than 60 days.
8. Under Mail - "Send Memo"
9. Address to send is "AUSTADMIN"
10. Subject: "AppleCare Registration Form"
11. Send Memo as normal.

The AppleCare Confirmation Certificate

When the AppleCare Registration Form is completed as described above, Apple will send your client the Confirmation Certificate.

The AppleCare Renewal Letter

As with all AppleCare agreements, Apple sends the client a renewal letter, 30 days prior to expiration of coverage. Apple also send you a list of your clients whose contracts are about to expire so that you can contact them to ensure that they did receive the renewal and to check if they would like to take out AppleCare in the case of an expiring warranty or continue with AppleCare in the case of an expiring AppleCare contract.

SRO Claims

Remember, travel expense is your only exposure with on-site service agreements secured with AppleCare. Apple reimburses you for parts and labor, via the 3 - tier reimbursement system.

In the event that you have made a service call, simply complete the SRO form as you would for any other AppleCare repair. All invoicing and administration will remain the same.

AppleCare Terms and Conditions

The following are the terms and conditions of the AppleCare agreement between Apple and the client. These terms and conditions are printed on the back of the AppleCare registration form. You should always ensure that the terms and conditions are cut from the registration form and given to the client for his information.

AppleCare Carry-In Service Plan Terms and Conditions

AppleCare offers a manufacturer-supported prepaid service plan for your Apple personal computer including all Apple-manufactured peripheral devices and interface cards (the "Apple products"). In addition, you may obtain add-on coverage for Apple products added to your covered systems at any time.

Under the basic AppleCare service plan, Apple agrees to service and provide all labour and parts necessary to repair your Apple products listed in this document under "equipment to be covered" (the "covered equipment") and restore it to proper operating order, upon the terms and conditions set forth below.

Under the add-on AppleCare coverage, Apple agrees to add the Apple products listed under "equipment to be covered" to your existing AppleCare service plan. In addition Apple will, on your request, allow existing multiple AppleCare agreements to be consolidated onto one contract. All add-on coverage or consolidations will be pro rata to the expiration date of the original or new agreement.

If you want AppleCare coverage for an Apple product which is no longer under warranty or an AppleCare agreement, the request can be made through an Apple authorised reseller, service centre or direct with Apple Computer Australia Pty. Ltd. An Apple authorised reseller, service centre or Apple Computer Australia Pty. Ltd. has the option to require an inspection of equipment to be covered to determine its acceptability for AppleCare coverage. A separate charge for this inspection may be applied. Apple authorised resellers or service centres providing AppleCare coverage to themselves are required to follow all terms and conditions of this agreement. All charges for coverage shall be due and payable in full as of the date of this agreement and shall be NON-REFUNDABLE once paid. All rebates due Apple authorised resellers or service centres providing coverage to themselves, in accordance with current AppleCare policy, will be sent from Apple within six weeks.

1. Terms of Agreement

In consideration of payment by you of the fees listed above AppleCare Carry-In service plan applies to the covered equipment for the periods noted in the agreement commencing from the date of this agreement.

Add-On AppleCare service coverage extends from the periods noted under "equipment to be covered" commencing from the LATER of (i) the date of this Agreement, or (ii) if there is stated warranty period of time set out in the Apple Warranty applicable to the particular Apple Product at the expiration of that time. IN NO EVENT shall the period of Add-On AppleCare service extend beyond the expiration of your existing AppleCare Service Plan.

All charges for coverage shall be due and payable as of the date of this agreement and shall be NON-REFUNDABLE once paid.

2. Service Provided

Except as otherwise set out in this agreement, Apple agrees to provide REMEDIAL MAINTENANCE and REPAIR, including all parts and labour, that Apple deems necessary and appropriate to restore failed covered equipment to proper working condition.

3. Service Excluded

Coverage under this agreement does not include:

* Electrical work external to the covered equipment, adding, installing, removing and maintenance of accessories, attachments, machines or other devices (Apple and non-Apple) not covered by this agreement.

* Repair, maintenance and adjustment to covered equipment required for reasons other than ordinary wear and tear, including, but not limited to neglect, misuse (including faulty installation, repair or maintenance by parties other than Apple or an authorised Apple reseller service centre), accident, modification without Apple's prior written approval, use with other devices not covered under this agreement, improper environment (including lack of proper air conditioning, temperature or humidity control), unusual physical or electrical stress or interference, failure or fluctuation of electrical power, lightning, static electricity, fire, or acts of God, or if the serial numbers of the equipment have been tampered with, obliterated or removed.

- Routine maintenance, such as, but not limited to, periodic cleaning of printer heads, ribbon replacement, furnishing of supplies, accessories or consumable items such as, but not limited to paper, ribbons, diskettes, tapes, toner, quartz halogen lamps, or the refining or replacement of any external cosmetic plastic or plated parts including the cabinet and cabinet parts.

- Service necessitated to comply with requirement of regulations and any governmental body or agency arising after the date of this agreement.

- Service to products listed under "equipment to be covered" but deemed by Apple not to be Apple products. Funds paid in association with such products will be forfeited to Apple.

4. Obtaining Service

In order to obtain service, you must deliver the covered equipment to be serviced, during the terms of this agreement to the authorised Apple reseller from whom you purchased AppleCare coverage or authorised service centre.

If you cannot return the covered equipment to that reseller or authorised service centre then deliver it to any other authorised Apple reseller stocking the same equipment or Apple authorised service centre. (For the location of the authorised Apple reseller or service centre nearest you call Apple Computer (008 025355.)

The covered equipment must also be accompanied by the relevant AppleCare agreement certificate (original AppleCare agreement certificate if products are delivered in person or a copy is delivered by any other means) received from Apple Computer Australia Pty. Ltd. All interconnecting cords and cables must accompany the covered equipment to be serviced.

All non-Apple equipment, accessories, attachments and modifications and all programs, data and storage media must be removed from the covered equipment before it is delivered for service, and Apple shall not be responsible for items that are not removed.

You will be contacted when your covered equipment is ready for pick-up or, at your option, if other arrangements are made for shipping it to you it will be at your expense.

5. Limitation of Liability

Apple in its sole discretion may replace the covered equipment in whole or in part with comparable equipment and may use manufactured and refurbished parts and modules in performing its obligations hereunder.

Replacement parts and modules shall become your property, the replaced parts shall become the property of Apple, and Apple shall have no obligation to return replaced parts.

Except for non-excludable warranties rights and remedies arising under the Trade Practices Act 1974 and similar State and Territory laws and as otherwise permitted by law, all warranties, conditions and liability of any kind imposed by statute or by rule of law with regard to the subject matter hereof, the service to be provided by Apple, and parts and other materials to be supplied by Apple including, without limitation, any implied warranty or condition of mercantile or fitness for a particular purpose are hereby excluded and Apple shall have no liability or responsibility to you or any other person or entity with respect to any liability, loss or damage caused directly or indirectly by Apple, Apple replacement parts or units, or service provided by Apple including, but not limited to, any interruption of service, loss of business or anticipatory profits or consequential damages resulting from the use or operation of the equipment, and Apple shall not be liable for negligence, for loss of profits or any indirect, special, or consequential damages.

Insofar as liability under or pursuant to any legislation whether State, Territory or Commonwealth may not be excluded, such liability is limited to: (i) the replacement of the goods or the supply of equivalent goods or payment of the cost of replacing the goods: or (ii) the repair of the goods or payment of the cost of having the goods repaired: or (iii) the supplying of the services again: or (iv) the payment of the cost of having the services supplied again.

If, during the term of this agreement, any of the covered equipment is modified, or if any of the equipment is damaged as a result of its use with equipment not covered by this agreement, Apple shall have the option, at its own election, to terminate this agreement.

6. General

You may transfer this agreement along with your Apple products with the prior written consent of Apple. Apple may subcontract performance of its obligations under this agreement to third parties, but shall not be relieved of its responsibilities thereby.

If you wish to contact Apple for any reason concerning AppleCare service of this agreement, you must send a letter to Apple Computer Australia Pty. Ltd.

This Agreement is valid only in Australia, new Zealand, Fiji and Papua New Guinea. AppleCare carry-in service supplied by Apple Computer Australia through authorised distributors or retail resellers in those countries receive reciprocal service amongst these countries.

The terms and conditions of this agreement shall prevail over any conflicting, additional or

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other terms of any purchase order or other document you submit unless they have been expressly accepted in writing by a duly authorised employee of Apple.

This Agreement is governed by the laws of the State of New South Wales.

Continue with the next section - "Exercise : AppleCare - Part 1"

Exercise: AppleCare - Part 1

Part 1

This first part will help you check your understanding of the AppleCare program policies and to emphasize key points about that program.

Directions

For items 1 through 9, indicate whether the statements are correct or incorrect by circling TRUE or FALSE.

1. Selling AppleCare contracts is one way that your service department can contribute to the profitability of your business.

   TRUE   FALSE

2. Apple reimburses businesses for parts, but not labor, on AppleCare repairs.

   TRUE   FALSE

3. AppleCare can save money for the customers.

   TRUE   FALSE

4. You can obtain marketing materials and AppleCare order forms free from your regional Apple Support Centre.

   TRUE   FALSE

5. All Apple equipment automatically qualifies for AppleCare coverage, even older equipment.

   TRUE   FALSE

6. Your dealership must send renewal notices to your customers to remind them to renew their AppleCare coverage.

   TRUE   FALSE

7. If you send the whole product to Apple without pre-authorization, Apple will not honor an AppleCare service claim.

   TRUE   FALSE

Exercise: AppleCare : Part 1

8. When Don Roberts upgrades his Macintosh 128K to a Macintosh Plus, he has to pay additional money for the existing AppleCare policy to cover the upgrade.

   TRUE   FALSE

9. When Marta Maldonado upgrades her Macintosh SE by adding an internal hard disk, she had to buy a new policy to cover the hard disk.

   TRUE   FALSE

Directions

For items 10 through 13, answer as indicated.

10. Dave Lukens is buying AppleCare for his system and equipment, as listed below. Check which items that require separate AppleCare coverage. Do not check the items that would be included as part of the system at no additional charge.

    ___ a.   Apple IIGS

    ___ b.   keyboard

    ___ c.   memory expansion card

    ___ d.   external hard disk

    ___ e.   interface card

    ___ f.   cables

11. Describe two types of situations when you, an Apple technician, can sell AppleCare to a customer.

    1) _____

    _____

    2) _____

    _____

Exercise: AppleCare : Part 1

13. AppleCare coverage is sold by the month. What is the minimum and maximum number of months that can be covered by one agreement?

minimum number of months = _____

maximum number of months = _____

14. Within how many days after filling out an AppleCare Order Form should you send a copy to Apple?

_____ days

Compare your answers with those on the following pages.

Exercise: AppleCare : Part 1
(Answers)

Directions   Compare your answers with those given below.

1. **TRUE** - Your dealership earns a margin of 50% on each contract when it's sold and generous reimbursement for parts and labor on every AppleCare repair job. No other Apple product delivers a higher dealer margin than AppleCare.

2. **FALSE** - AppleCare covers parts and labor for all Apple personal computer systems including Apple-manufactured peripheral devices and interface cards.

3. **TRUE** - Dealeships can pass their savings on to the customers.

4. **TRUE** - Your Regional Service Centre provides free promotional materials and order forms for the AppleCare Service Plan.

5. **FALSE** - Older Apple equipment does not automatically qualify for AppleCare coverage. You, the technician, must inspect the equipment to make sure it's in good condition.

6. **FALSE** - Apple sends the renewal notices to your customers.

7. **TRUE** - You need authorization (RMA) from your regional Technical Support Engineer to return a whole product to Apple.

8. **FALSE** - The upgrade is covered by the original policy.

9. **TRUE** - The installation of a hard disk is not considered an upgrade and requires a separate AppleCare agreement.

10. The checked items would required additional AppleCare coverage.

       ___ a. Apple IIGS
       ___ b. keyboard
       _X_ c. memory expansion card
       _X_ d. external hard disk
       ___ e. interface card
       ___ f. cables

Exercise: AppleCare : Part 1
(Answers)

11. Service technicians have many opportunities to sell AppleCare. Generally, you can promote this service plan in the following types of situations:

    1) When you are returning a system to a client after you have repaired it.

    2) When a client asks you for technical advice or information.

    Perhaps you can think of other opportunities for promoting AppleCare.

    With experience, you will learn how to take advantage of your interactions with clients to promote this service plan, thus increasing the profitability of your service department.

12. minimum = 12 months
    maximum = 36 months

13. within 14 days

Continue with "Exercise : AppleCare : Part 2" on the next page.

Exercise: AppleCare : Part 2

Part 2

This second part will help you check your ability to identify products covered by the AppleCare program.

Directions

Put a check by each of the following products that can be covered under the AppleCare Service Plan. As needed, use the list of covered products (reproduced on pages 53 through 57 of this module) that appears on the jacket of the AppleCare Order Form packet.

_____ ImageWriter II Printer

_____ LaserShare Print Spooler

_____ Apple 5.25 Disk Drive

_____ Monitor IIc

_____ Joystick

_____ Macintosh Numeric Keypad

_____ AppleColor RGB Monitor

_____ ProDOS

_____ Apple IIGS

_____ Hand Controller

_____ MacWrite

_____ AppleLine 3270 File Transfer

_____ Hard Disk 40SC

_____ Super Serial Card (with system)

_____ Apple II Memory Expansion Card

_____ Apple Personal Modem

_____ AppleShare File Server

Compare your answers with those on the next page.

Exercise: AppleCare : Part 2
(Answers)

Directions   Compare your answers with those given below.

    X   ImageWriter II Printer

    _____   LaserShare Print Spooler

    X   Apple 5.25 Disk Drive

    X   Monitor IIc

    _____   Joystick

    X   Macintosh Numeric Keypad

    X   AppleColor RGB Monitor

    _____   ProDOS

    X   Apple IIGS

    _____   Hand Controller

    _____   MacWrite

    _____   AppleLine 3270 File Transfer

    X   Hard Disk 40SC

    X   Super Serial Card (with system)

    X   Apple II Memory Expansion Card

    X   Apple Personal Modem

    _____   AppleShare File Server

Did you miss more than two items on the entire exercise? If so, you should to take time now to review the content provided in the section entitled *The AppleCare Program*

Otherwise....

AppleCare Price Pages

Product #	A/Care #	Product Description	Annual	Monthly
Systems				
A2P200	1A	IIe 128k System	$60.00	$5.00
A2P604	3A	Apple IIgs 512KB	$132.00	$11.00
A0012X/A	280	Apple IIgs 1MB	$144.00	$12.00
A2P605	3	Apple IIgs 1.25MB	$156.00	$13.00
A2S2048	1B	Apple II & Apple II+	$144.00	$12.00
A2S2128X	1	Apple IIe	$60.00	$5.00
A2S4100X	2	Apple IIc 128K	$96.00	$8.00
A2S6000X	3B	Apple IIgs 256KB	$120.00	$10.00
A3S0S56P	12A	Apple III+	$180.00	$15.00
A3S0256P	12	Apple III	$228.00	$19.00
A6S0203P	13	Lisa 2.0	$360.00	$30.00
A6S0203P	13A	Lisa 2.5	$564.00	$47.00
A6S0204P	13B	Macintosh XL	$600.00	$50.00
M2128A	4B	Macintosh 128K	$168.00	$14.00
M2503X	5	Macintosh Plus	$204.00	$17.00
M2512A	4A	Macintosh 512K/400K	$216.00	$18.00
M2530X	4	Macintosh 512K/800K	$216.00	$18.00
M5251X	7	Macintosh S.E. 1MB HD20	$384.00	$32.00
M5252	6	Macintosh S.E. 1MB Floppy	$300.00	$25.00
M0062X/A	207	Macintosh S.E. 2MB HD20	$396.00	$33.00
M5355X	9	Macintosh S.E. 2MB HD40	$504.00	$42.00
ASCSE30U	213	Macintosh S.E. 30 1MB HD20	$408.00	$34.00
M5359X	17	Macintosh S.E. 30 2MB HD40	$432.00	$36.00
M5361X	18	Macintosh S.E. 30 4MB HD80	$540.00	$45.00
M5300X	10	Macintosh II 1 MG3.5 FD	$462.00	$38.50
M5400X	11	Macintosh II 1MG HD40	$660.00	$55.00
M5410X	14	Macintosh II 4MB HD40	$732.00	$61.00
M5820X	15	Macintosh IIx 4MB Floppy	$744.00	$62.00
M5830X	16	Macintosh IIx 4MB HD80	$888.00	$74.00
M5860X	16A	Macintosh IIx 4MB HD160	$936.00	$78.00
M5660X	204	Macintosh IIcx 1MB Floppy	$516.00	$43.00
M5670X	205	Macintosh IIcx 2MB HD40	$600.00	$50.00
M5680X	206	Macintosh IIcx 4MB HD80	$744.00	$62.00
M5710X/A	212	Macintosh IIci Floppy	$552.00	$46.00
M5730X/A	210	Macintosh IIci 2MB HD40	$612.00	$51.00
M5740X/A	211	Macintosh IIci 4MB HD80	$708.00	$59.00
ASCM5510X	214	Macintosh IIfx 4MB Floppy	$816.00	$68.00
ASCM5515X	215	Macintosh IIfx 4MB HD80	$900.00	$75.00
ASCM5520X	216	Macintosh IIfx 4MB HD160	$1,008.00	$84.00
M5350X	208	Macintosh Portable 1MB Floppy	$696.00	$58.00
M5352X	209	Macintosh Portable 2MB HD40	$360.00	$30.00
M0421X/A	403	Macintosh Classic 1/FI	$102.00	$8.50

Prices shown may not reflect actual prices.

AppleCare Price Pages

Product #	A/Care #	Product Description	Annual	Monthly
M0435X/A	404	Mac Classic 2/40	$174.00	$14.50
M0440X/A	217	Mac LC 2/FI	$168.00	$14.00
M0442X/A	218	Mac LC 2/40	$240.00	$20.00
M0363X/A	219	Mac IIsi 2/40	$432.00	$36.00
M0364X/A	220	Mac IIsi 5/80	$540.00	$45.00

Printers

Product #	A/Care #	Product Description	Annual	Monthly
A2M0036	63A	Silentype	$72.00	$6.00
A2M0059	63B	Dot Matrix	$108.00	$9.00
A3M0027	6F	Daisy Wheel	$252.00	$21.00
A9M0306Z	63E	Scribe	$66.00	$5.50
A9M0302P	63F	Colour Plotter	$102.00	$8.50
A2M0007	174	Graphics Tablet	$78.00	$6.50
A9M0303P	63C	Imagewriter	$72.00	$6.00
A9M0305Z	63D	Imagewriter 15"	$72.00	$6.00
A9M0310Z	60	Imagewriter II Printer	$72.00	$6.00
A9G0332	61	Imagewriter II Sheet Feeder	$12.00	$1.00
A9M0340B	60A	Imagewriter LQ Printer	$168.00	$14.00
A9G0340	61A	Imagewriter LQ Sheet Feeder	$33.00	$2.75
A9G0341	61B	Imagewriter LQ Expansion Bin	$21.00	$1.75
A9G0343	61C	Imagewriter LQ Envelope Att.	$6.00	$0.50
M0156Z	63	LaserWriter	$684.00	$57.00
M0166B	62	LaserWriter Plus	$684.00	$57.00
M6200X	66	LaserWriter II SC	$420.00	$35.00
M6210X	67	LaserWriter II NT	$636.00	$53.00
M6215X	68	LaserWriter II NTX	$792.00	$66.00
A2P0337	169	Apple Scanner	$192.00	$16.00
M0096X/A	401	Personal LaserWriter SC	$252.00	$21.00
M0-097X/A	402	Personal LaserWriter NT	$348.00	$29.00
M6115B	405	Personal LaserWriter LS	$144.00	$12.00
M8050B	406	StyleWriter	$66.00	$5.50

Monitors

Product #	A/Care #	Product Description	Annual	Monthly
A2M2010X	20	Monitor II	$48.00	$4.00
A2M4090X	21	Monitor IIc	$48.00	$4.00
A3M0024	20B	Monitor III	$48.00	$4.00
A2M4022Z	21B	Flat Panel Display IIc	$54.00	$4.50
A2M6020X	23	Colour Monitor IIc	$60.00	$5.00
A2M6017X	22A	Monitor IIe - 12" Green Screen	$24.00	$2.00
A2M6021X	22	Colour Monitor IIe	$48.00	$4.00
A2M6014X	25	IIgs RGB Colour Monitor	$60.00	$5.00
A2M6016X	24	IIgs Monochrome Monitor	$48.00	$4.00

Prices shown may not reflect actual prices

AppleCare Price Pages

Product #	A/Care #	Product Description	Annual	Monthly
M0400PA	26	Mac II High Res Mono Mon.	$48.00	$4.00
M0401X	27	Mac RGB Col. Monitor	$114.00	$9.50
M0402X	301	Apple Two Page Mono Monitor	$210.00	$17.50
M0404X	302	Apple Macintosh Portrait Display	$120.00	$10.00
M029X/A	304	Mac 12" Mono display	$36.00	$3.00
ASCM027X	303	Mac 12" RGB Display	$60.00	$5.00

Disks

Product #	A/Care #	Product Description	Annual	Monthly
A2M0003	44B	Disk II	$54.00	$4.50
A2M4050	42	Disk IIc	$48.00	$4.00
A3M0004	40B	Disk III	$54.00	$4.50
M0130	45A	400K Mac. Drive	$54.00	$4.50
M0131	45	800K Mac. Drive	$54.00	$4.50
A9M0107Z	44	Apple 5.25" Drive	$48.00	$4.00
A9M0106PA	43	Apple 3.5" Drive	$54.00	$4.50
A9M0110Z	48	Apple PC 5.25 Ext. Drive	$42.00	$3.50
A9M0108	900	Duodisk	$72.00	$6.00
A2M2053	40	Unidisk 3.5"	$54.00	$4.50
A9M0104	41	Unidisk 5.25" + Controller	$48.00	$4.00
A9M01005	46Z	Profile 5MB	$216.00	$18.00
A9M0100Z	905	Profile 10MB	$252.00	$21.00
M2516X	102	Mac Int. 800KB Drive	$36.00	$3.00
M0216	107	Mac Internal 20MB SC	$108.00	$9.00
M0232	108	Mac Internal 40MB SC	$144.00	$12.00
M0233	109	Mac Internal 80MB SC	$204.00	$17.00
M0267	501	Mac Internal 160SC Hard Disk	$324.00	$27.00
M0247PA	503	Mac Internal FDHD Drive	$42.00	$3.50
M2600	46A	HD 20MB	$252.00	$21.00
M2620	46	HD 20MB SC	$120.00	$10.00
M2644	46C	HD 40MB SC	$156.00	$13.00
M2688	46D	HD 80MB SC	$228.00	$19.00
M2666	502	HD 160MB SC	$336.00	$28.00
M2640	47	Apple 40MB SC Tape Backup	$144.00	$12.00
A2C2002	49	Unidisk 3.5 Accessory Kit II+/IIe	$9.00	$0.75
M2700X	52	AppleCD SC ROM	$144.00	$12.00
ASCM0112	504	External SuperDrive	$36.00	$3.00

Miscellaneous

Product #	A/Care #	Product Description	Annual	Monthly
A2M2003	165	Numeric Keypad	$36.00	$3.00
M0120 .	168	Macintosh Numeric Keypad	$36.00	$3.00

Prices shown may not reflect actual prices

AppleCare Price Pages

Product #	A/Care #	Product Description	Annual	Monthly
Data Communications				
A9M0301X	80	Apple Modem 1200 Baud	$48.00	$4.00
A9U0002	81	Apple Personal Modem	$36.00	$3.00
A9U0003	82	Apple In Modem	$33.00	$2.75
A9M0307	83	AppleLine	$105.00	$8.75
A9U0004	84	Apple Personal Modem Plus	$48.00	$4.00
M2313	85	LocalTalk PC Card	$48.00	$4.00
Upgrades, Expansion Kits and Interface Cards				
M0218	115	Macintosh 1MB Memory Exp. Kit	$18.00	$1.50
M0219	116	Macintosh 2MB Memory Exp. Kit	$36.00	$3.00
M0707	117	Macintosh 4MB Memory Exp. Kit	$144.00	$12.00
M2516X	106	400K to 800K Disk Dr & 128 Rom Upg	$24.00	$2.00
M2418	101	Mac Plus Logic Board Upgr 512K 1MB	$84.00	$7.00
A2M2052Z	104	Apple IIe Enhancement Kit	$12.00	$1.00
A2M2058	128	Apple II 256K Memory Exp Kit	$18.00	$1.50
M6005	131	LaserWriter II NTX 1MB Expansion	$36.00	$3.00
M6006	132	LaserWriter II NTX 4MB Expansion	$144.00	$12.00
M0191	103	LaserWriter PostScript Upgrade	$120.00	$10.00
M6009X	141	LaserWriter II Upgrade SC to NT	$276.00	$23.00
M6004X	142	LaserWriter II Upgrade NT to NTX	$264.00	$22.00
	144	LaserWriter II Upgrade SC to NTX	$432.00	$36.00
A2B0015	121	IEEE-488 Card	$12.00	$1.00
A2B0021	122	Parallel Interface Card	$6.00	$0.50
A2B0044	123	AII Super Serial Card	$6.00	$0.50
A2B2086	110	AII Memory Expansion Card	$24.00	$2.00
A2B4156	113	AIIc Memory Expansion Card	$24.00	$2.00
A2A6008	111	IIgs 256K Memory Exp. Card	$18.00	$1.50
A2A6009	112	IIgs 1 MB Memory Exp. Card	$48.00	$4.00
A2B2022	125	80 Column Text Card	$24.00	$2.00
A2B2023	124	Extended 80-Column Text Cd & Vid Cd	$24.00	$2.00
A9B0312	114	I'writer II 32K Memory Opt	$6.00	$0.50
A9B0311	126	Imagewriter II AppleTalk Opt	$12.00	$1.00
M0211PA	129	Macintosh II Video Card	$60.00	$5.00
M0213	130	Macintosh Video Cd Exp/Kit	$18.00	$1.50
M0234	133	Macintosh II PC 5.25 Drive Card	$18.00	$1.50
M0235	134	Macintosh SE - Bus Drive Cd	$18.00	$1.50
A2A0005	119	Apple IIe PAL Card	$6.00	$0.50
A2B2087	127	Apple II SCSI Card	$24.00	$2.00
M0225	135	Ethertalk Card	$96.00	$8.00
ASCM0444X	137	Apple IIe card	$18.00	$1.50
A9B0314	65	LocalTalk Option Connect Kit	$24.00	$2.00

Prices shown may not reflect actual prices

AppleCare Price Pages

Product #	A/Care #	Product Description	Annual	Monthly
M0504	601	Macintosh II 1 Bit Video Card	$18.00	$1.50
M0260	602	Mac II Two Page Mono Video Card	$60.00	$5.00
M0119X	603	Mac II Portrait Display Video Card	$60.00	$5.00
ASCM0412LL	604	Apple II Video Overlay Card	$36.00	$3.00
M0237	608	Token Talk Interface Cards	$144.00	$12.00
ASCM0121X	605	Mac Video Card 4 bit	$72.00	$6.00
ASCM0326LL	616	IIci Cache Card	$36.00	$3.00
ASCM0517LL	615	512K VRAM	$24.00	$2.00
ASCM0376LL	614	Mac IIfx 4 Meg Upgrade	$72.00	$6.00
ASCM0292LL	613	Mac IIci 4mb Exp Kit	$72.00	$6.00
ASCM0291LL	612	Mac IIci 1mb Exp Kit	$18.00	$1.50
ASCM0513LL	609	Mac IIsi/IIci 8mb Mem Upgrade	$144.00	$12.00
ASCM0505LL	607	Mac Video Card 8/24 bit	$216.00	$18.00
ASCM0122X	606	Mac Video Card 8 bit	$108.00	$9.00
A2A0004	118	Ext 80 Col Video/Col Text Card	$6.00	$0.50
M0480LL/A	620	030 Directo Slot Adaptor Card	$24.00	$2.00
M0481LL/A	621	NuBus Adaptor Card	$24.00	$2.00
M6361LL/A	622	Classic Memory Upgrade	$18.00	$1.50
M0514LL/A	623	Mac IIsi/ci 2mb Exp Kit	$36.00	$3.00
A2B2088	136	Apple II Workstation card	$24.00	$2.00
M0480LL/A	628	EterNet NB Card	$42.00	$3.50
M0443LL/A	624	EtherNet LC Card	$18.00	$1.50
M0329LL/A	625	EtherNet Thin Coax Tranceiver	$18.00	$1.50
M0432LL/A	626	EtherNet AUI Adaptor	$18.00	$1.50
M0437LL/A	627	EtherNet Twisted Pair Tranceiver	$18.00	$1.50

Prices shown may not reflect actual prices

Filling Out the AppleCare Form

Guide to Filling Out the Form

This section provides directions for filling out the AppleCare Order Form and two situations that you can use to practice filling out the form.

Parts of the Order Form

The numbered steps below refer to the circled numbers on the sample form on the next page.

Each Apple hardware component to be covered must be listed on the AppleCare Service Plan Order form. Each product has its own AppleCare product number. AppleCare product numbers and suggested retail prices are listed on:

- The AppleCare price card
- The Apple Authorised Pricing Binder
- The Service Price List Binder

The Initial Registration Form

The initial AppleCare "Carry-In Service Plan" Agreement **must be for 12 months minimum - 36 months maximum.** All equipment checked will be covered until the expiration date recorded. Additional peripherals purchased after the original agreement can be added to existing coverage by pro-rating (months only) on a new registration form so that all expiration dates are the same.

Missing data or badly filled forms will be returned to the sender and the agreement will be considered as not being complete until re-submitted.

1   Fill out **Client and Reseller** sections completely and accurately. Fill in Client No if Client has had a Warranty or AppleCare Agreement previously and the Expiring Contract Number.

2   **Start Date.** Ensure you insert the start date required. If AppleCare is purchased when the equipment is purchased, the AppleCare start date is the day after the expiration of the 12 month warranty. In this case, please send the warranty form in with the AppleCare Service Plan Order form.

3   Check **System Coverage** if this is a new agreement. If the equipment has been out of either Warranty or AppleCare cover for more than sixty days, we need you to state that your technician has tested the equipment and that it is in good working order. **There is a section on the bottom of the SPO form for your technician to sign.**

Sample AppleCare Form

Apple**Care** Registration Form

Your details (Please complete fully and accurately.)

Client Number:

Note: If you have an Apple Client number and/or a Contract number, please insert here.

Expiring Contract Number:

Purchase or Contact Name: Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname:

Given Name:

Initial: ☐

Department or Title:

Company Name or School:

Address: _____

_____ P/Code: _____

Country: _____

Phone Business: _____

Phone Private: _____

Authorised Apple Reseller information

Reseller Name: _____

Suburb: _____

Reseller Number: _____ Salesperson Name: _____ Contract Start Date: ②

Equipment purchase date:* _____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage.

Technician/Engineer Signature _____ ③ _____ Date: _____

Reseller Name _____

Equipment covered

AppleCare Part No.	Product Description	Product Serial Nos.	No. of Months	Cost per Month	Total cost (Undiscounted)
④			⑦	⑥	⑧

(AppleCare part no., product descriptions and monthly pricing are shown on Price Card.)

Total Amount: $ _____ ⑨

Less Discount (if applicable): $ _____ ⑩

AMOUNT DUE: $ _____ ⑪

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ Date _____ ⑫

Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: __/__/__ Card No: _____

Cardholder Name: _____ Cardholder Signature X _____

Filling Out the AppleCare Form

4   Enter the correct **AppleCare Code Numbers** for the recorded products to be covered.

5   Enter the **Product Descriptions** for the Main System and all peripherals to be covered on this agreement as well as the associated **serial numbers.**

6   Enter the **price** for the AppleCare product **per month.**

7   This being the initial agreement the number of months **must** be 12 months minimum - 36 months maximum. The only instance when an AppleCare Agreement can be for less than 12 months is when the client wishes to consolidate two or more contracts into one AppleCare Agreement so that they have the same expiry date.

8   Multiply the number of months by the price to arrive at the totals.

9   Add up Total Cost column + sub-totals on Supplementary Sheets and insert this figure in the "Totals (undiscounted)" column.

10   Work out discounts due (see pages 31 to 33) and include the total in the "Discount" section.

11   Take the discount total away from the Total (Undiscounted) to work out the total due.

12   Your **client must sign and date** the agreement.

•   Send Apple's copy of the form within 14 days to:

AppleCare Administrator
Locked Bag 11
FRENCHS FOREST NSW 2086

•   An AppleCare Agreement certificate will be sent directly to your client as proof of acceptance and registration by Apple. Your client should receive this within six weeks after receipt by Apple. The certificate must be retained for presentation in the event of a service claim. The Service Plan Order form can be used as a temporary number until this certificate is received by the customer.

Continue with the next section — Exercise : Filling out the AppleCare Form.

Exercise - Filling Out the AppleCare Form

Directions   Complete the AppleCare Order Form provided on the next page for this situation:

Case 1   On "date : exactly one year ago today", Mary O'Neal purchases the following equipment and software, which she now wants covered under AppleCare for a year:

Apple IIc	S/N 00300125
Monitor IIc	S/N 076869
Disk Drive IIc	S/N 00077302
ImageWriter II Printer	S/N 200259
AppleWriter word processor	

Mary lives at 42 Park Road, French's Forest, NSW 2086
Phone: (02) 452-8156
Her client number is 00369 and Warranty Certificate contract number is 754002

Note: *Use the AppleCare price pages on pages 54 - 58 of this module.*

When you have completed the form, check your form against that on page 65.

Directions   Complete the AppleCare Order Form provided on page 64 for this situation:

Case 1   On "date : exactly two and a half years ago today", Bill Roberts purchased an Apple IIGS 1mB system, an Apple Monochrome Monitor, an Apple 3.5 Drive, and after his Warranty expired, a two-year AppleCare Service Plan.

Now, Bill has decided to buy a second hand ImageWriter II printer (S/N 016812). He wants the printer covered under an AppleCare agreement that will expire the same month as the agreement that covers his IIGS system. Bill's client number (from his original AppleCare agreement) is 126347. The Contract number is 650769.
His address is 68 Burwood Ave., Newtown, NSW 2042. Phone: (02) 51 4580.

Note: *Use the AppleCare price pages on pages 54 - 58 of this module.*

When you have completed the form, check your form against that on page 66.

If all is correct ......
Continue with the next section - The Module Exchange Program.

Exercise - (Case 1)

AppleCare Registration Form

Your details
(Please complete fully and accurately.)

Client Number: ☐☐☐☐☐☐ ◀ Note: If you have an Apple Client number and/or a Contract number, please insert here. ▶ Expiring Contract Number: ☐☐☐☐☐☐

Purchase or Contact Name: Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Given Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Initial: ☐

Department or Title: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company Name or School: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Address: _____

_____ P/Code: _____

Country: _____ Phone Business: _____ Phone Private: _____

Authorised Apple Reseller information

Reseller Name: _____ Suburb: _____

Reseller Number: _____ Salesperson Name: _____ Contract Start Date: _____

Equipment purchase date:* _____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: _____ Date: _____

Reseller Name: _____

Equipment covered

AppleCare Part No	Product Description	Product Serial Nos	No. of Months	Cost per Month	Total cost (Undiscounted)

(AppleCare part no , product description and monthly pricing are shown on Price Card.)

Total Amount: $ _____
Less Discount (if applicable) $ _____
AMOUNT DUE: $ _____

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ Date _____
Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: ___/___/___ Card No. _____

Cardholder Name: _____ Cardholder Signature: __X_____

Exercise - (Case 2)

AppleCare Registration Form

Your details
(Please complete fully and accurately.)

Client Number: ☐☐☐☐☐☐ ◀ Note: If you have an Apple Client number and/or a Contract number, please insert here. ▶ Expiring Contract Number: ☐☐☐☐☐☐☐

Purchase or Contact Name: Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Given Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Initial: ☐

Department or Title: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company Name or School: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Address: _____

_____ P/Code: _____

Country: _____ Phone Business: _____ Phone Private: _____

Authorised Apple Reseller information

Reseller Name: _____ Suburb: _____

Reseller Number: _____ Salesperson Name: _____ Contract Start Date: _____

Equipment purchase date:* _____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: _____ Date: _____

Reseller Name: _____

Equipment covered

AppleCare Part No	Product Description	Product Serial Nos	No. of Months	Cost per Month	Total cost (Undiscounted)

(AppleCare part no , product description and monthly pricing are shown on Price Card)

Total Amount:	$
Less Discount (if applicable)	$
AMOUNT DUE:	$

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ Date _____
Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty. Ltd
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box)

Expiry Date: ___/___/___ Card No: _____

Cardholder Name: _____ Cardholder Signature: _X_____

Answer for Case 1

AppleCare Registration Form

Your details
(Please complete fully and accurately.)

Client Number: `0 0 3 6 9` ◄ Note: If you have an Apple Client number and/or a Contract number, please insert here. ► Expiring Contract Number: `7 5 0 0 4 2`

Purchase or Contact Name: Mr ☐ Mrs ☐ Miss ☐ Ms `X` Other _____ Surname: `O ' N E I L`

Given Name: `M A R Y`   Initial: ☐

Department or Title: [ ]

Company Name or School: [ ]

Address: _42 PARK RD.   FRENCH'S   FOREST   N.S.W._

P/Code: _2086_

Country: _AUSTRALIA_ Phone Business: _____ Phone Private: _(02) 452 8156_

Authorised Apple Reseller information

Reseller Name: _'Your Reseller Name'_ Suburb: _'Your Suburb'_

Reseller Number: _'Your No.'_ Salesperson Name: _'Your Name'_ Contract Start Date: _'Today's Date'_

Equipment purchase date:' _____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: _____ Date: _____

Reseller Name: _____

Equipment covered

AppleCare Part No.	Product Description	Product Serial Nos.	No. of Months	Cost per Month	Total cost (Undiscounted)
2	APPLE IIc	00300125	12	$8.00	96.00
21	MONITOR IIc	076869	12	$4.00	48.00
42	DISK IIc	00077302	12	$4.00	48.00
60	IMAGEWRITER II	200259	12	$6.00	72.00

(AppleCare part no , product descriptions and monthly pricing are shown on Price Card.)

Total Amount: $ 264.00
Less Discount (if applicable) $ —
AMOUNT DUE: $ 264.00

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ `X X X X X X` Date _'Today's Date'_
Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: __/__/__ Card No: _____

Cardholder Name: _____ Cardholder Signature: _X_____

Answer for Case 2

AppleCare Registration Form

Your details
(Please complete fully and accurately.)

Client Number: `1` `2` `6` `3` `4` `7` ◄ Note: If you have an Apple Client number and/or a Contract number, please insert here. ► Expiring Contract Number: `6` `5` `0` `7` `6` `9`

Purchase or Contact Name: Mr `X` Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: `R` `O` `B` `E` `R` `T` `S`

Given Name: `B` `I` `L` `L`   Initial: ☐

Department or Title:

Company Name or School:

Address: 68 BURWOOD Ave.   NEWTOWN   N.S.W.

_____ P/Code: 2042

Country: AUSTRALIA   Phone Business: _____   Phone Private: (02) 51 4580

Authorised Apple Reseller information

Reseller Name: 'Your Reseller Name'   Suburb: 'Your Suburb'

Reseller Number: 'Your No.' Salesperson Name: 'Your Name'   Contract Start Date: 'Today's Date'

Equipment purchase date: '_____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage.

Technician/Engineer Signature: 'Your Signature'   Date: 'Today's Date'

Reseller Name: 'Your Reseller Name'

Equipment covered

AppleCare Part No.	Product Description	Product Serial Nos.	No. of Months	Cost per Month	Total cost (Undiscounted)
60	IMAGEWRITER II	016812	6	$8.00	48.00

(AppleCare part no , product descriptions and monthly pricing are shown on Price Card.)

Total Amount: $ 48.00
Less Discount (if applicable): $ —
AMOUNT DUE: $ 48.00

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. ___ X X X X X X X ___ Date: 'Today's Date'
Client Signature

Payment authority

I have enclosed my cheque for $_____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: ___/___/___ Card No: _____

Cardholder Name: _____ Cardholder Signature: __X_____

The Module Exchange Program

Introduction

In this section, you will learn the difference between "stock" and "exchange" prices for service modules. You will learn how to determine whether or not a customer's faulty module qualifies for the exchange price. (If it doesn't, your service department will have to pay the full stock price for the new module and will generally charge the customer accordingly.)

The Exchange Program

Apple has found that a system of module swapping is the easiest, most economical, and highest quality method of repair at the first, or service provider, level. The Apple Module Exchange Program is the means by which you send defective modules to Apple and receive in return functional modules.

It works like this:

Stock Price

1. The service provider purchases an initial service module at the **stock price**.

2. The service provider troubleshoots and removes a faulty module from the customer's system, replaces it with the service module from his inventory, and sends the satisfied customer home with a fully tested and working system.

3. The service provider then sends the faulty module back to Apple for repair.

Exchange Price

4. Upon receipt of the faulty module, Apple returns a functional module of the same type — and charges the service provider the **exchange price** this time.

5. The service provider then places the new functional module back in his inventory.

The Module Exchange Program

Exchanges Save Money

So, what's the difference between an "exchange" module and a "stock" module? Absolutely nothing, except price. Apple charges less for exchange modules than for stock modules, and the customer saves money because most service providers charge lower rates for repairs that are based on exchange rather than on stock price.

Most modules that you remove from a customer's system will be acceptable for exchange. If the module has not suffered damage or unauthorized modification, it can be exchanged.

Identifying Modules that Qualify

To learn how to identify modules that qualify for the exchange program, read the following pages which have been reproduced from the *Apple Service Programs* binder.

Then continue with - Exercise: Identifying Modules That Meet Exchange Criteria.

2.1 RETURNED AND REPAIRED EXCHANGE MODULES CRITERIA

2.1.1 CRITERIA FOR DEFECTIVE MODULES

The following defines the criteria for defective modules that should be returned to Apple Computer.

1. Repairable Modules

If the customer's defective module shows no signs of modification or damage, it is considered repairable and is to be treated as an exchange. **Apple will return any module submitted for exchange that is incomplete or contains extra items.** Refer to the *Module Identification* or the take-apart sections of the *Technical Procedures binder* to determine what is included on or with a module. When returning modules to Apple, refer to the packaging instruction included in the chapter eight of this manual.

2. Preparation of Repairable Modules

Exchange Modules must be prepared according to the *Technical Procedure binder* and the *Module Identification binder.* Failure to do so will result in the return of the exchanged module or charged to your account. Apple Service Administration will advise by telephone all unacceptable modules. You will then have 15 days to advise whether you want the part returned or scrapped. All returned modules will be at your cost , ie. you will be charged for return freight, plus a $25.00 admin fee. Modules not required must be advised in writing, in which case they will be scrapped. In addition, the following action may be taken by Apple on certain improperly prepared modules:

- Any module containing the wrong configurations of ROM(s) and RAM(s) or any proprietary part will be returned unprocessed.

- A module incorrectly packaged will be accepted and your account may be charged.

- A module containing extra parts (for example SIMMs), manuals, and/or software may be accepted for exchange, but the replacement module will not be returned with the extra parts

Any module that is returned unprocessed will be accompanied by a Problem Product Receipt Notice explaining the reason for the return.

3. **Non-Reparable Modules**

You may not return modules with any of the following to Apple Computer:

*   Cracked, broken, or burned PC Boards

*   Blown IC's/components with damaged substrates

*   lifted traces/pads due to unauthorised soldering or other modifications

*   Attempts to rework the module at the component level (except for switch & fuse replacements)

*   Missing components and/or parts

*   Disk drive head carriage wires exposed, nicked or cut

*   Disk drive load pads containing any foreign substance

When a defective module is non-reparable, you should charge the customer for a new service stock module. Discard the defective module. You will need to order another service stock module to replenish your service inventory. If you return a module to Apple that is deemed non-reparable, you will be charged for a new service stock module.

2.1.2   CRITERIA FOR REPAIRED EXCHANGE MODULES

The following defines the cosmetic appearance of repaired exchange modules which Apple returns to you:

*   Any portion of a module that is visible (on the exterior of a product) to the customer when installed, may contain minor surface scratches and/or dents

*   Any portion of a module that is not visible to the customer when installed must meet the following stated criteria as a minimum

1. **Board Assemblies (PCB)**
    MISSING PADS — Missing pads are allowed as long as the following conditions exist:

    -   No traces connect to the missing pad.

    -   A good solder joint exists on any component, wire, etc. that connects to that

location. The solder joint must be visible.

FLUX RESIDUE — Flux residue should not exist.
JUMPER WIRES — Reworked jumper wires may appear on either side of the board.

GOLD PLATED CONTACT FINGERS — Gold plated contact fingers must be free of solder for a minimum of 0.20 inches from the leading edge of the bevel.

2. Keyboards

KEYCAP COLOUR — All keycaps should be present, the same colour, texture, and moulding style. Apple may at our discretion, accept keyboards that have a maximum of two keycaps missing.

KEYCAP SCRATCHES — All keycaps shall be free of scratches on the top surface. Minor scratches on the sides of the keycaps may exist.

3. Power Supplies

CASING SCRATCHES — Surface scratches are acceptable as long as the casing shape has not been deformed. A surface scratch is defined as any mark or impression to the casing surface.

CASING DENTS — Minor dents/bends in the casing up to half an inch in diameter are acceptable provided they do not affect fit and function. The power switch and cord site shall be free of dents/bends. Any dents/bends in excess of half an inch are not acceptable.

4. Disk Drives

FACE AND LOGO PLATES — The face and logo plates may contain minor surface scratches and/or dents.

2.3 BUSINESS RULES FOR ADVANCE SHIP

To ensure that our repair cycle has adequate material at all times, it is essential that defective exchangeable parts are returned to Apple in a timely manner. For this reason, the following "Business Rules" will apply to all Advance Shipments of exchange modules sent out from Apple as from February, 1991. Note: these are additional to any other rule relating to returned parts that may be stated within this manual.

1. Advance Shipment (AS) will only be made on the basis that the"rules" as outlined here are agreed to in full.

2. All payments are 30 days from invoice/statement, or as otherwise agreed with Apple in writing.

3. Advance Shipments will be available to all Service Providers initially via facsimile or mail only. ie. we will not accept verbal telephone orders.

4. AS will ultimately be available electronically to resellers and consortium members who wish to participate. ie. remote on-line access.

5. When an AS is made, service provider will have maximum 15 calendar days to return the defective module to Apple for exchange credit.

6. If module is NOT received by Apple within calendar 15 days, part will be billed at FULL RRP (less appropiate discount).
   ie. AS will effectively be converted to a SALE.
   Note: this transaction will NOT be reversible.

7. Subsequent receipt of the defective module will be treated as a **new transaction**, and will be processed accordingly.

8. No exceptions will be made, except for proven courier/ Apple delays.

9. Warranty/Applecare will be similarly treated. Parts not returned within 15 calendar days will be converted to a SALE at RRP, less appropiate discount.

10. If the module is received within the 15 days, but no warranty proof, the exchange will be processed and charged at normal rates, except that if the correct serial number is supplied, our program will check Apple's shipping or AppleCare data base to try to verify warranty or AppleCare.

11. If warranty/Applecare proof is subsequently received (and within 30 days total), then warranty/AppleCare credit will be given, but an Admin charge will be levied (currently $25.00).

12. Admin charges will be two way. You make a mistake, and charge will be levied. Conversely, if Apple's mistake, the charge will be credited.

13. No warranty/AppleCare reimbursement will be given over 30 days from part shipment. The service provider is required to obtain warranty proof before completing the job.

14. Sales Tax will not be reimbursed for parts used in warranty. Allowance for this has been averaged into the 3-tier reimbursement structure.

15. For purchases, all Sales Tax exemption claims must be accompanied by a signed form (Facsimile is acceptable).

16. Sales Tax not claimed at time of purchase must be claimed back through the service provider's own accounting channels, else the admin fee will be charged.

17. System will be product serial number driven (eg. cpu, monitor, external disk drive, etc) . ie. the product serial number is a must.

NOTE: The program will interogate our data base for all warranty, and cannot do this without the product s/n being supplied. eg. FYXXSSSM5000W, etc.

However, for keyboards, mice, internal upgrades, etc, you should use the s/n from the back of the main cpu box.

Exercise: Identifying Modules that meet Exchange Criteria

Part 1

Directions   Answer the following three items as indicated.

1. Briefly describe in your own words how the Apple Module Exchange Program works.

    _____

    _____

    _____

    _____

    _____

    _____

    _____

2. What's the difference between a stock module and an exchange module?

    _____

3. You used an Advanced Shipment module for a repair. Within how many days after the date Apple shipped the AS module to you should you send the defective part to Apple?

    within _____ days

Exercise: Identifying Modules that meet Exchange Criteria

Compare your answers to those provided on the next page.

Exercise: Identifying Modules that meet Exchange Criteria (Answers)

Compare your answers to those given below.

1. The key points of the Apple Module Exchange Program are these:

   - You buy an initial service module at the stock price.
   - When repairing a system, you replace a faulty module with the service module from your inventory.
   - You send the faulty module back to Apple for repair.
   - Apple sends you a functional module of the same type and charges you the exchange price.
   - You place the new module back in your inventory.

2. The exchange module costs less than the stock module.

3. Within 15 days

Continue with Part 2 on the next page.

Exercise: Identifying Modules that meet Exchange Criteria

Place a check mark by the number of each example that meets Apple's exchange criteria for modules. Base your judgment on the information given.

1. ___ You discover that the logic board of Mary Smith's IIGS has been "enhanced" by the addition of ICs and soldered jumper wires.

2. ___ You diagnose the problem with the school district's Macintosh SE as a faulty video board that looks OK but just doesn't work.

3. ___ Jim Martin brings in an Apple IIc mouse that has been immobilized by a sticky substance.

4. ___ You discover that Joan Thompson's ImageWriter II logic board is missing an IC.

5. ___ Sybil Faulty's Hard Disk 20 fails the *Macintosh Hard Disk Drive Diagnostic*. The intact controller board is diagnosed as the problem.

6. ___ The local YMCA brings in an old ImageWriter Printer whose CPU card has finally given out.

7. ___ Anne Turner brings in her Apple Modem 1200 with a cracked PCB.

8. ___ You discover that the load pads on the school district's Apple 5.25 Drive are jammed with a paper fiber material.

9. ___ The components on the power supply of John Reed's Apple IIe have been altered.

10.___ The carriage wires of Bob Brown's Macintosh External 800K Drive have been cut by a sharp object used to forcibly eject a diskette.

Compare your answers to those provided on the next page.

Exercise: Identifying Modules that meet Exchange Criteria (Answers)

Compare your answers with those given below.

1. ____ You discover that the logic board of Mary Smith's IIGS has been "enhanced" by the addition of ICs and soldered jumper wires.

2. _X_ You diagnose the problem with the school district's Macintosh SE as a faulty video board that looks OK but just doesn't work.

3. ____ Jim Martin brings in an Apple IIc mouse that has been immobilized by a sticky substance.

4. ____ You discover that Joan Thompson's ImageWriter II logic board is missing an IC.

5. _X_ Sybil Faulty's Hard Disk 20 fails the *Macintosh Hard Disk Drive Diagnostic*. The intact controller board is diagnosed as the problem.

6. _X_ The local YMCA brings in an old Dot Matrix Printer whose CPU card has finally given out.

7. ____ Anne Turner brings in her Apple Modem 1200 with a cracked PCB.

8. ____ You discover that the load pads on the school district's Apple 5.25 Drive are jammed with a paper fiber material.

9. ____ The components on the power supply of John Reed's Apple IIe have been altered.

10.____ The carriage wires of Bob Brown's Macintosh External 800K Drive have been cut by a sharp object used to forcibly eject a diskette.

If you missed more than one of these items, you should revise the guidelines presented the *Service Programs Binder* excerpts, Sections 2.1 and 2.3.

Otherwise ...

Continue with the next Section - The Service Repair Order Form

The Service Repair Order Form

2.2.1 INTRODUCTION

The Service Repair Order (**SRO**) form must be used by resellers who want to be reimbursed by Apple for equipment repairs and adjustments in which Apple is involved. The SRO form has been developed to satisfy the administrative requirements of the Apple Level I Service program. Failure to fill out the form correctly or neatly may result in the delay of the reimbursement or in some cases holding of the reimbursement until the form is correctly filled out.

The SRO **must** be used when a repair is performed on equipment under the 12 month limited warranty, AppleCare Carry-In Service, or any other situation where Apple is involved. This includes module exchanges and **authorised** Repair-and-Return systems.

The SRO is designed to be used in all repair situations. It provides you with a record of all service transactions, a written estimate for your customers and a bill for your services. Spaces are also available for your business information.

The SRO performs three functions:

1. **Provides necessary repair information:**
   When Apple receives a module for repair, the information on the SRO form is compared with the failure detected at the Repair Centre. When the SRO information is detailed and accurate, it allows the failure to be verified quickly and the module to be thoroughly repaired. This is extremely important for the modules belonging to new products.

2. **It provides automatic restocking of modules**
   Apple Copy - module portion of the SRO form, is used to track module repairs through the Repair Centre. When Apple receives a defective module with this copy attached, an order for the new module of the same type is automatically generated. The Exchange Module is shipped to you and you are invoiced the Reseller exchange price of the module. In the majority of cases this module is turned around within 1.5 days, not including transport time.

3. **It provides a means of billing for repairs or parts and becomes a vehicle for Apple to reimburse Service Providers under Warranty and AppleCare.** The form itself serves as a method of billing for the services provided. In an Out-of-Warranty repair situation, the customer, is given a copy of the SRO form and can use

it as a record of the work performed. If the repaired equipment is under Warranty or AppleCare, the form is submitted to Apple with **Proof of Purchase** and your claim is paid by Apple. The customer should always receive a copy of the SRO form.

An SRO form **must** be sent with an exchange module when it is shipped to Apple. You will be billed for the exchange module or credited for Warranty/AppleCare claims at the end of the billing month.

2.2.2 THE SRO FORM IN DETAIL

The SRO consists of five parts, therefore when writing on the form please **bear down** with a ball-point pen so that all copies will be legible, the bottom copy is the Reseller copy.

The five parts of the SRO form are used as follows :-

- **Customer's Copy (Green)** which is the top form. In Out-of- Warranty situations this is used as an invoice for your customer. In Warranty situations it acts as a service record for your customer.

- **Apple Copy - Module (Pink)** Include this and the 2 following portions of the form (purple & grey) with the exchange module you send to the Apple Support Centre. Please use a rubber band around the module to hold the form in place.

  Note: If adhesive tape is used to affix the form to the exchange module damage may occur to the component used as a fixing point, as thousands of volts can be generated on the tape as it is removed from the tape reel. This is to be avoided in all instances as it may cause delay in processing your order.

- **Apple Copy - Processing (Purple)** This is the third form. In Out-of-warranty situations it acts as a parts usage record for Apple. In Warranty situations this is used as an invoice to Apple. It forms the basis for all Data Processing at the Support Centre.

- **Apple Copy - Return (Grey)**
  This part of the form is not returned, instead an Apple picking/packing slip is generated from the details on the processing (purple) copy. The packing slip shows details of your SRO number to enable you to match the module with your paperwork.

- **Reseller Copy (Blue)**
  This is the last page of the form. As you remove the forms from the book this copy will be left behind in the book as your record. Please quote this reference in all your communication with Apple service.

  Note: Copies (b), (c) and (d) as outlined above must all be sent to Apple with the exchange module.

2.2.3   COMPLETING THE SRO FORM

The top portion of the SRO should be completed with the customer when he/she brings the equipment in for service.

1. Reseller Identification

- **SRO #** - This is the pre-printed number on the SRO form and is to be used in all correspondence.

- **RMA #** - An RMA number is only issued by Apple Service Admini-stration Staff in **exceptional** cases for the return of faulty systems and advance shipments. Please note that if a system is returned without this number, it will be returned to the sender.

- When you fill in the SRO form, you **MUST** ensure that your resellership name and **Reseller Number** are completed correctly.

2. Customer Information

| 2 | Customer Details | * If Customer Has An Apple Customer Number Please Insert Here | * Customer No.: |

Customer Name:

Address:

| | | | ( ) |
| Suburb | | State | Post Code | Phone No. |

Customer identification is mandatory for Warranty and AppleCare reimbursements

• **Customer Details** - Enter customer's number (if they have one), name, address and phone details in the space provided.

N.B.   The customer is the Owner of the machine, not necessarily the user. This is especially true for large acccounts e.g. Government agencies.

3. Product Information

| 3 | Product Details | Product Requiring Service | Model Number | Product/System Serial No. |

Date Received: Other Information:

• **Product Requiring Service** - Enter the serialised product or item being serviced, This may not be necessarily be a CPU unit but its peripheral e.g. Disk II, Monitor, Scribe, Disk IIc etc.....

• **Model No.** - Enter here the model number of the product being serviced. This information is mandatory if this is a Warranty or AppleCare repair.

• **Product/System Serial No.** - Enter here the serial number of the product being serviced. This information is mandatory if a Warranty or AppleCare repair.

• **Date Received** - Enter the day, month and year on which you received the product to be serviced.

4. Repair Information

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: ___/___/___

☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ___/___/___ INOPERABLE UPON FIRST USE: ☐ YES ☐ NO	☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER: ☐☐☐☐☐☐☐☐☐	☐ AppleCare EQUIPMENT PURCHASE DATE: ___/___/___ AGREEMENT NUMBER: ☐☐☐☐☐☐☐☐ EXPIRATION DATE: ___/___/___	☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: ☐☐☐☐☐☐☐ DATE ___/___/___	☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO.: ☐☐☐☐☐☐☐☐☐ ☐☐☐ ___/___/___ DATE ___/___/___

☐ OTHER:

FAULT:_____

This section is for recording the transaction type. **Please check only one box, that is, one transaction per SRO.**

- **Out of Warranty** - If product is out of warranty or not covered by AppleCare then tick this box. Enter the date of purchase/upgrade of the failed product, if known.

- **Apple Limited Product Warranty** - If product fails within the first 12 months of initial purchase then tick this box. Fill in date of purchase and "Yes" or "No" tick if product happens to fail 'out of the box'.

- **Repair Material Authorization (RMA)** - If you are returning whole Apple product for repair your Service Administration Specialist will give you a number to enter into this field. Do not send whole product back to Apple without an RMA number.

- **AppleCare** - If product is currently under AppleCare tick the box, fill in purchase date of equipment, the AppleCare agreement number under which the product is covered and the expiration date of the agreement.

- **Limited Repeat Service Warranty** - All Apple service modules/parts carry 3 months' warranty. Tick this box if the same module/ parts fail within 3 months of a repeat servicing of an Apple product. The original date of service and SRO number must be quoted.

- **Service Stock Inoperable upon first use, Received in sales order No.** If for any reason your services modules from Apple is DOA (Dead on Arrival) fill out this section with your order no and the date of that order.

- **Other** - If for any reason none of the above fields satisfy their repair type tick this box and fill in your description. As an example, from time to time Apple may issue a **Repair Extension Authorisation** on certain repairs at no cost to the end user and reimburses the Service Provider accordingly. Specific information about each repair Extension Authorisation is located in the **Product Notices** and will always include a Repair Extension Authorisation Code and repair description.

- **Fault** - A sensible clearly written description of the fault, **not the repair,** is what is required here. A short well written description will greatly help the repair centre when it comes time to repair your module and improve the repair time, thereby the turnaround time on your modules.

5) Parts

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
			⌊⊥⊥⊥⊥⌋-⌊⊥⊥⊥⊥⌋-⌊⊥⊥⌋	
			⌊⊥⊥⊥⊥⌋-⌊⊥⊥⊥⊥⌋-⌊⊥⊥⌋	
			⌊⊥⊥⊥⊥⌋-⌊⊥⊥⊥⊥⌋-⌊⊥⊥⌋	
			⌊⊥⊥⊥⊥⌋-⌊⊥⊥⊥⊥⌋-⌊⊥⊥⌋	

Repaired By: _____ Date: ___/___/___

Total Parts	
Sales Tax	

Customer Signature: _____ ___/___/___
Equipment Pick Up Date

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: _____

Labour	Rate	X	hrs	
Travel		X		
	Freight		
	Total		

This section is for recording the parts and exchange modules that have been used in the repair.

- **Quantity** - Fill in the quantity of the part used to repair the equipment.
  Note: Multiple parts may be entered on the same SRO **if** the parts were all required to repair the same serialised product and **if** they are all covered by the same Service Type, ie Warranty, AppleCare, Service Warranty, New Warranty, etc.

- **Part Number** - Enter Apple's part number in this space. Part numbers of modules, replacements parts, and adjustments can be found in the Service Price manual.

- **Description** - A brief description of the module used in the repair. This should correspond with the description in the Apple Service Price Binder (P/N A072-0082B).

- **Repair Confirmation Code/System Code** - This is Apple's preferred method of collecting failure information.

  You should provide a Module Symptom Code (MSC). Refer to the "You Oughta Know..." section of the Cross Family Peripheral Technical Procedures, or the top cover of your SRO pad for the MSC list. The MSC should be recorded in this area.

  Apple has a strong commitment to improving product quality and when you include the MSC, Apple receives a wealth of information regarding the specific failure information of the equipment. By collecting this failure information, Apple will be able to improve the quality of existing and future products, service modules, and diagnostics.

- **Amount** - This is for entering the amount you charged for the exchange module/part(s) used. Apple's Recommended Retail Price (RRP) can be found in the AppleService Prices Manual.

- **Total Parts** - Add together the retail prices of the parts used. **Sales tax** is applicable on all new parts & stock modules (except where an official sales exemption form is produced). Sales tax is not payable if the repair involves using an Apple exchange module.

- **Labour Costs** - Determine your labour cost and enter in labour section. If the repair is carried out under Warranty or AppleCare your reimbursement will be that figure shown in the 3 - Tier list for that product. Even under Warranty and AppleCare put your own labour costs. In that way the customer see the value of Apple's Warranty and AppleCare programs.

- **Travel and Freight** - Items are not applicable at the present time.

  Total: Add together the parts, tax, and labour costs.

- **Repaired by whom and date** - Print the name of the service technician who repaired the product or whom the Service Centre can contact with any questions on the SRO. Also enter the date that the repair was completed.

- **Customer's Signature** - The customer's signature is one of the most important pieces of information to go onto the SRO, especially for Warranty and AppleCare reimbursements.

- **Resellers's Signature** - This is important if you wish to be reimbursed by Apple for Warranty or AppleCare repairs on Apple Product.

6) Shipping Details

6 Shipping Details

Part No. Shipped	Date Shipped	Consign. Note No.	Courier
661 -	/ /		

The shippping details section is for Apple use. Please do not write here.

2.4   WARRANTY AND APPLECARE REPAIRS

This section describes Apple's procedure for reimbursing (and invoicing) resellers for performing repairs on Apple Products under the 12 month Limited Warranty or AppleCare Carry-In Service Agreements.

Apple reimburses authorised service centres for module exchanges, specified replacement parts, and specified adjustments only.

2.4.1   QUALIFICATION

It is the customer's responsibility to furnish proof that the product is within the Warranty or AppleCare period.

It is the service provider's responsibility to verify that the product is within the Warranty or AppleCare period by checking the customer's proof of purchase and the product serial numbers. NOTE: this should be done at the time that service is requested, so as to avoid any possibility of conflict when the customer calls to pick up their machine after repair.

Apple will honour Limited 12 month Warranty and AppleCare Carry-In Service claims involving:

• Module Exchanges of unmodified standard Apple modules;

• Authorised System Repair and Returns

• Authorised Level I replacement parts and certain diagnosable** replacement parts as listed in the current Apple Service Price Binder under the heading of Replacement Parts; and

• Authorised Level I adjustments.

** Diagnosable components are the components which can be tested by Apple supplied diagnostics. Apple diagnostics include all diagnostic diskettes and cards.

2.4.2   TERMINOLOGY

Exchange Module - An Exchange module is a fully functional equipment module shipped to you when you send an inoperative unmodified/personalised module to the

Apple Service Centre. When a defective module is sent to the Apple Service Centre as an Exchange module, the Service Centre sends a known good module of the same type back to the Reseller. The goal at Apple (not including transportation) is 2.0 working days turn-around time for these modules subject to availability.

Exchange Pool - The Exchange Pool is Apple's stock of fully functioning exchange modules, one of which is shipped to you when you send an inoperative module to an Apple Service Centre. To qualify for exchange, all inoperative modules you send to Apple must be in good enough condition for Apple to repair and place into the Exchange Pool. Apple doesn't want to ship resellers modules that have been modified or personalised or that are cosmetically unacceptable. Therefore, any module that is not considered acceptable is unsuitable for the exchange pool and will not be accepted for exchange.

Service Stock - Service Stock is defined as the spare equipment modules which are purchased and held in a Reseller's service inventory. This stock is to be maintained in accordance with the growing installed base of the Reseller.

Service Repair Order - Or SRO is the service order form required for claiming of reimbursement from Apple and is a record of all service transactions.

Replacement Part - A replacement part is any service part that is eligible for the Warranty and AppleCare reimbursement fee, excluding modules.

Other Part - Other parts are service parts that do not qualify for the Warranty and AppleCare reimbursement fee.

Recomended Level 1 Spares - Are the minimum spares required to be held by an authorised Level I Service Centre, to enable them to effectively support a product.

Recommended Retail Price (RRP) - This is the suggested price to charge the customer for the part. Repair labour is not included in the suggested Retail Price of exchange modules. Resellers are free to set their own prices for out-of-warranty and non-AppleCare repairs.

Apple Limited Warranty - See section 6.0 for details.

2.4.3 COMPENSATION AND REIMBURSEMENT

The Reseller compensation procedure is the same for both AppleCare Carry-In Service and Apple Limited Warranty.

Payment - Resellers will be paid a fixed fee to exchange modules and make authorised adjustments on each Apple product under warranty and AppleCare. The fixed reimbursement fee is compensation for the labour time spent on each product, plus the expected cost of inventorying the part over the warranty segment of the parts service life. Reimbursement is paid on a one per product basis and compensates for diagnosis, module exchanges, replacement parts, adjustments and administrative time, as well as the inventorying cost. (See the Apple Service Prices Manual to determine the reimbursement credit for each of the different Apple products.)

Exchange Modules - For Warranty and AppleCare, Resellers and certain other Apple authorised service providers will receive a fixed fee ("3-tier") monetary reimbursement in the form of a credit against their account, plus a guaranteed good module for each defective module sent in for exchange*.

For warranty and AppleCare repairs, Apple will credit your monthly statement, provided that the defective exchange module and customer details are correctly reported on the SRO, and that the SRO is accompanied with Proof of Warranty. Thus, since you are being reimbursed for both labour time and materials, it is just as profitable to perform service under Warranty or AppleCare as for out-of-warranty.

* Note: Where more than one module is required to repair any single system, then a 3-tier reimbursement fee for each module is credited, and all defective modules are exchanged free of charge.

Warranty Example:
        Module Exchange (Under Warranty or AppleCare)
        e.g. A module with an Exchange fixed price repair charge of $173.75

Customer: No Charge and Fast Service (within one working day)

Reseller revenues:
        1.   Tier-2 Credit for Exchange Module - $115.00
        2.   Free replacement part (ie. no cost to you for part)

        Estimated time to service - 45 minutes at $50.00/hour cost - $37.50
        Estimated cost of inventorying the part - $56.00
        Profit on Repair - $21.50 - 23%

Replacement Parts - Resellers will be credited the
Recommended Retail price (RRP) of the designated replacement parts when they are
defective and correctly and fully reported on an SRO, *less* their purchasing discount,
plus the appropriate 3 - Tier reimbursement.

Note: replacement parts need NOT be returned to Apple along with the SRO.
Apple will not exchange such parts. New Spare parts must be ordered
(See guidelines to ordering parts).

Specified Adjustments - Performance of specified adjustments must be documented
on the SRO to receive 3-tier reimbursement. When performing adjustments, resellers
will be reimbursed at the appropiate 3-tier rate per product as listed in the Apple Service
Price List Binder.

Payments - Once a month, all reimbursement credits will be combined and credited to
the reseller's account.

*All questions regarding invoices, payments or parts received from Apple must be
directed to your Apple Service Centre within 30 days from receipt of the invoice,
payment or parts.*

2.4.4 SYSTEM REPAIR AND RETURNS

Resellers are NOT to send a WHOLE PRODUCT to Apple for repair, under the standard
SRO process unless there are technical problems beyond the service provider's
capability (see below for exceptions). Only defective modules should be shipped to the
Apple Service Centre. Whole systems will not be accepted for Repair and Return unless
duly authorised by Apple Technical Support.

Authorisation comprises a 'phone call to the Apple Technical Support outlining the
reasons for requesting that the whole system be returned to Apple for repair. If the return
is considered necessary then you will be issued with a Return Authorisation Number
which is to be written on the SRO in the **RMA#** field.

The "666" part number is a prefix for faulty whole systems. On the *Apple Service Price
list Binder* pages the part number for the System Repair and Return will appear as "666"
at the top of each price page for the product being serviced, along with the
corresponding repair charge for that system.

Currently the exception to the above are the Monitor IIc and Monitor III. These are sent
back to Apple as a whole system repair and return, **without** the need for an RMA #.

For In-Warranty or AppleCare Repair and Returns (Authorised System Only), there will be no charge, and an appropiate reimbursement credit will be issued to cover your administration costs.

eg. No Repair Cost to the Service Provider or to the end Customer.

Out-of-Warranty Repair and Returns (Authorised System Only).
An invoice will be generated for the total system Repair and Return charge as indicated in the current Apple Service Price List Binder. This invoice will not be discounted.
No credit will be issued.

Unauthorised systems, that is without an RMA#, will not be accepted for repair and return and will be shipped back to the sender at his/her cost.

2.4.5 MODULE REPAIR AND RETURN

Modified and/or personalised modules will not be accepted for repair and return status. These will be shipped back to the sender at his/her cost. The sender has the option to purchase a service stock as a replacement.

Service providers may, at your option, continue to receive personalised/modified modules from the customers. If a module has been personalised/modified then your Service Stock may be used for the repair, but the customer's module is not eligible for the Apple exchange program. The personalised/modified module should remain the property of the customer, and the customer requested to purchase a new, and unmodified, module. If requested to do so, service providers may attempt to repair the customer's module, but Apple will not be responsible for identifying and/or supplying any component parts that may be required to make these repairs.

Likewise, DO NOT send modules that have missing components, bad soldering, burnt tracks, or laminate, etc, as these are also not eligible for exchange.

2.4.6 INVALID CLAIM

1. Warranty and AppleCare carry-In Service claims will not be honoured if:

* A whole product is sent to Apple, when a module-level repair program exists for that product, unless the return has been duly authorised by Apple Tech Support.

* Adjustments are made to a product which is within specifications, for the purpose of fine-tuning the product to better-than-specification.

* The 12-month Limited Warranty or AppleCare Carry-In Service Agreement has expired. The customer must provide proof of purchase. The Service Provider must verify that the warranty or AppleCare agreement has not expired and is not otherwise invalid.

* The Exchange module sent to Apple has unauthorised modifications, blown, cracked, missing I.C.'s or improper packaging.

* The customer has voided his Warranty or AppleCare agreement (See Warranty Exclusions).

* The claim for reimbursement is not accompanied by a correctly completed SRO form.

* Warranty proof is not provided within 30 days.

2. Apple 12 month Limited Warranty claims for adjustments or repairs made during pre-sale checkout are valid only if:

* The Apple product is not functional.
* The Apple Product is not within published specifications.

2.5   OUT OF WARRANTY REPAIRS

An "Out-of-Warranty" product is one that is no longer covered by the Apple 12-month Limited Warranty, or an AppleCare Carry-In Service Agreement.

Resellers should handle repairs on Out-of-Warranty systems exactly like Warranty and AppleCare repairs except the customer pays for the repair, not Apple.

If the customer's defective module has not been modified, then you should treat it as an exchange module. The customer should be charged for the parts used including the labour to complete the repair. Resellers are free to set their own prices in Out-of-Warranty situations.

Exercise: Filling Out the SRO Form

Directions

On the following page, you will find a blank SRO form. Fill it out for the following situation:

Case 1

Customer: John Brown   (03) 568-8565 (BH)
                 1234 Centre Rd.   (03) 544-2348 (AH)
                 Clayton, Vic. 3168

John has brought in a Macintosh Plus (S/N 3236520575, Model No. M2513), which he purchased at your store two months ago. John shows you his *Warranty Certificate* with *Customer Number* 666900. He said he had been using his system when suddenly the screen went black and a "Sad Macintosh" icon appeared in the centre. He said he could get no further response—the system would not reboot. You are unable to boot MacTest 7.0. After replacement of the logic board, the system passes MacTest. Using the *Module Symptom Code* chart on the inside top cover of the SRO book, you enter the code *1021* on the SRO form.

Using the *3 tier reimbursment schedule* you enter a Labour Fee of $115.00 for the repair and follow the RRP module pricing guidlines as per *Service Price list.*

Module pricing details are as follows :

Part No.	Module Name	Exchange Price	RRP (No Exchange)
661-0525	"LOGIC BOARD,MAC PLUS		
	(WITHOUT RAM"	$387.84	$969.60

Use Today's date when filling out the SRO.
You inform John the system will be ready tommorrow.

When you have completed the SRO form, compare it to the answer form on the page following the blank form. Correct any errors you may have made, taking time to think about the reasons why you were incorrect.

If your answer was not correct, complete Case 2 for more practice, otherwise continue reading the excerpts starting with "Packing and Shipping Instructions".

SRO Form (Case 1)

Service Repair Order

Apple Computer Australia Pty. Ltd.

SRO #

SRO #

| Office Use Only | ___ / ___ / ___ | S/O NO: | RMA NO: |

1 Reseller Details

Reseller Account No.:

Reseller Name:

Address:

| Suburb | State | Post Code | Phone No. ( ) |

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

* Customer No.:

Customer Name:

Address:

| Suburb | State | Post Code | Phone No. ( ) |

3 Product Details

| Product Requiring Service | Model Number | Product/System Serial No. |

Date Received:

Other Information:

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: ___ / ___ / ___

| ☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ___ / ___ / ___ INOPERABLE UPON FIRST USE: ☐ YES ☐ NO | ☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER: ⎣⎽⎽⎽⎽⎽⎽⎽⎽⎦ | ☐ AppleCare EQUIPMENT PURCHASE DATE: ___ / ___ / ___ AGREEMENT NUMBER: ⎣⎽⎽⎽⎽⎽⎽⎽⎦ EXPIRATION DATE: ___ / ___ / ___ | ☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: ⎣⎽⎽⎽⎽⎽⎽⎽⎦ DATE: ___ / ___ / ___ | ☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO: ⎣⎽⎽⎦ ⎣⎽⎽⎽⎽⎽⎽⎦ DATE: ___ / ___ / ___ |

☐ OTHER:

FAULT: _____

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
			⎣⎽⎽⎽⎽⎽-⎽⎽⎽⎽⎽-⎽⎽⎽⎦	
			⎣⎽⎽⎽⎽⎽-⎽⎽⎽⎽⎽-⎽⎽⎽⎦	
			⎣⎽⎽⎽⎽⎽-⎽⎽⎽⎽⎽-⎽⎽⎽⎦	
			⎣⎽⎽⎽⎽⎽-⎽⎽⎽⎽⎽-⎽⎽⎽⎦	

Repaired By: _____ Date: ___ / ___ / ___	Total Parts	
	Sales Tax	
Customer Signature: _____ ___ / ___ / ___ Equipment Pick Up Date	Labour Hrs X Rate	
I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.	Travel X	
	Freight:	
RESELLER SIGNATURE: _____	Total	

6 Shipping Details

Part No Shipped	Date Shipped	Consign Note No.	Courier
661 -	___ / ___ / ___		

SRO Form (Answer to Case 1)

Service Repair Order

Apple Computer Australia Pty. Ltd.

SRO # _____   SRO # _____

Office Use Only	___ / ___ / ___	S/O NO:	RMA NO:

1 Reseller Details

Reseller Account No.: *'Your Reseller Account No.'*

Reseller Name: *'Your Reseller Name.'*

Address: *'Your Reseller Address.'*

Suburb	State	Post Code	Phone No.

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

Customer No.: 666900

Customer Name: *John Brown*

Address: *1234 Centre Rd.*

Clayton	*Vic.*	*3168*	*(03) 568 8565*
Suburb	State	Post Code	Phone No.

3 Product Details

Product Requiring Service	Model Number	Product/System Serial No.
Macintosh Plus	*M 2513*	*3236520575*

Date Received: *'Today's Date.'*   Other Information: _____

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: ___ / ___ / ___

☒ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE; *'Two Months ago.'* INOPERABLE UPON FIRST USE: ☐ YES ☐ NO	☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER:	☐ AppleCare EQUIPMENT PURCHASE DATE: ___ / ___ AGREEMENT NUMBER: EXPIRATION DATE: ___ / ___	☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: DATE: ___ / ___ / ___	☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO.: DATE: ___ / ___ / ___

☐ OTHER: _____

FAULT: *'Sad Mac icon on power up, Unable to boot.'*

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
1	661-0525	*Logic Board, Mac Plus*	1 0 2 1 - ____ - ___	$387.84
		(Without RAM)	____ - ____ - ___	
			____ - ____ - ___	
			____ - ____ - ___	

Repaired By: *'Your Name'*   Date: *'Today's Date.'*

Customer Signature: XXXXXXXXXXXX   *'Tomorrow.'*

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: *'Your Signature'*

Total Parts	
Sales Tax	
Labour Hours X	$115.00
Travel X	
Freight	
Total	$502.84

Warranty - No Charge

6 Shipping Details

Part No. Shipped	Date Shipped	Consign. Note No.	Courier
661 -	___ / ___ / ___		

Exercise: Filling Out the SRO Form

If you need more practice, complete the Exercise for Case 2 on the next page.

Exercise: Filling Out the SRO Form

Directions   If you did not complete Case 1 correctly, Complete an SRO form for this situation:

Case 2   Customer: William Bailey   (02) 452-7731 (BH)
                              992 Warringah Road   (02) 452-8226 (AH)
                              French's Forest, NSW 2086

Mr. Bailey has brought in the following equipment, which he purchased at your store on April 1, 1987. His customer number is 000751. He is not covered under Apple*Care*.

Apple IIe PAL   S/N 159261297   Model No.   A2S2128

(this is one of the early PAL video format CPU's and ROM's unenhanced)

Apple 5.25 Drive   S/N 487611690   Model No.   A9M0107
Monochrome Monitor IIe   S/N 254897524   Model No.   A2M6017

He says that sometimes he has trouble booting, and that when he is able to boot, there is garbage on the screen. The unit fails the Apple IIe Diagnostic 4.1 : Logic Board Test and the Keyboard Test. You replace these items., which have a large amounts of Coca Cola spilled over them. After re-testing, the unit functions correctly. Using the *Module Symptom Code* chart on the inside top cover of the SRO book, you enter 3051 for the Logic board and 7031 for the keyboard.

The job takes 1.5 hours and your labour rate is $80.00 per hour.
You inform William the system will be ready tomorrow.
You decide to follow the module pricing guidlines as per *Service Price list.*
Module details are as follows :

Part No.	Module Name	Exchange Price	RRP (No Exchange)
B661-91084	"BD.LOGIC,AIIE.PAL"	$ 182.51	$ 550.86
B661-91085	"KEYBD.MECH.AIIE".	$ 72.95	$ 182.37

Use Today's date when filling out the SRO.

When you have completed the SRO form, compare it to the answer form on the page following the blank SRO form. Correct any errors you may have made, taking time to think about the reasons why you were incorrect.

Continue reading the excerpts starting with "Packing and Shipping Instructions"

SRO Form (Case 2)

Service Repair Order

SRO #

Apple Computer Australia Pty. Ltd.

SRO #

| Office Use Only | ____ / ____ / ____ | S/O NO: | RMA NO: |

1 Reseller Details

Reseller Account No.:

Reseller Name:

Address:

| | | | ( ) |
| Suburb | State | Post Code | Phone No. |

2 Customer Details

* If Customer Has An Apple Customer Number Please Insert Here

* Customer No.:

Customer Name:

Address:

| | | | ( ) |
| Suburb | State | Post Code | Phone No. |

3 Product Details

| Product Requiring Service | Model Number | Product/System Serial No. |

Date Received:

Other Information:

4 Repair Information -

IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION - Tick Only One Box in this Section.

☐ OUT OF WARRANTY PURCHASE/UPGRADE DATE: ____ / ____ / ____

| ☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ____/____/____ INOPERABLE UPON FIRST USE: ☐ YES ☐ NO | ☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER: | ☐ AppleCare EQUIPMENT PURCHASE DATE: ____/____/____ AGREEMENT NUMBER: EXPIRATION DATE: ____/____ | ☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: DATE: ____/____/____ | ☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO.: DATE: ____/____/____ |

☐ OTHER:

FAULT: _____

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
			☐☐☐☐☐-☐☐☐☐☐-☐☐☐	
			☐☐☐☐☐-☐☐☐☐☐-☐☐☐	
			☐☐☐☐☐-☐☐☐☐☐-☐☐☐	
			☐☐☐☐☐-☐☐☐☐☐-☐☐☐	

Repaired By: _____ Date: ____/____/____

Customer Signature: _____ ____/____/____

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: _____

	Amount
Total Parts	
Sales Tax	
Labour ___ X ___	
Travel X	
Freight	
Total	

6 Shipping Details

Part No. Shipped	Date Shipped	Consign Note No.	Courier
661 -	____ / ____		

SRO Form (Answers to Case 2)

Service Repair Order
Apple Computer Australia Pty. Ltd.

SRO #

SRO #

Office Use Only	___ / ___ / ___	S/O NO:	RMA NO:

1 Reseller Details

Reseller Account No.: *'Your Reseller Account No.'*

Reseller Name: *'Your Reseller Name.'*

Address: *'Your Reseller Address.'*

Suburb   State   Post Code   Phone No.

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

Customer No.: 000751

Customer Name: *William Bailey*

Address: *992 Warringah Rd.*

French's Forest   *N.S.W.*   *2086*   *(02) 452 7731*

Suburb   State   Post Code   Phone No.

3 Product Details

Product Requiring Service	Model Number	Product/System Serial No.
Apple IIe	*A2S2128*	*159261297*

Date Received: *'Today's Date.'*   Other Information: *Early Revision PAL Logic Board.*

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

[X] OUT OF WARRANTY   PURCHASE/UPGRADE DATE: *1-4-87*

[ ] APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ___ INOPERABLE UPON FIRST USE: [ ] YES [ ] NO	[ ] REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER:	[ ] AppleCare EQUIPMENT PURCHASE DATE: __/__/__ AGREEMENT NUMBER: EXPIRATION DATE: __/__	[ ] LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: DATE: __/__/__	[ ] SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO.: DATE: __/__/__

[ ] OTHER:

FAULT: *'Coca Cola spilt over Logic Board and Keyboard.'*
Fails Diagnostic Ver. 4.1, Logic and Keyboard tests.

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
1	*B661-91084*	*Bd. Logic, AIIe, (PAL)*	3 0 5 1 - -	*$550.86*
1	*B661-91085*	*Key.Bd. Mech. AIIe*	7 0 3 1 - -	*$182.37*
			- -	
			- -	

Repaired By: *'Your Name'*   Date: *'Today's Date.'*

Customer Signature: XXXXXXXXXXXX *'Tomorrow.'* Equipment Pick Up Date

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: *'Your Signature'*

Total Parts	
Sales Tax	
Labour Hours 1.5 x $80/hr Rate	$120.00
Travel X	
Freight	
Total	$853.23

6 Shipping Details

Part No. Shipped	Date Shipped	Consign. Note No.	Courier
661 -	__/__/__		

2.6   PACKING AND SHIPPING INSTRUCTIONS

2.6.1   UNPACKING

Common practice is to leave Exchange Modules unopened in their original package until they are used. Carefully examine how the Apple Product or Exchange Module is packed when you begin unpacking it. Please check for damage in transit. *Save the packing material* (boxes, foam inserts, bubble wrap etc.)

2.6.2   PACKING

Modules must be packaged in the same or exact duplicate packaging as received from Apple. If for some reason Apple packaging is unavailable, locate materials that will adequately protect the module from shipping damage and electrostatic discharge (ESD). **Anti-static bags must be used to pack any module which contains electronic components.**

If the original Apple packaging is unavailable, please follow these guidelines:

• Use a shipping box with dimensions which allow for adequate padding all around the module. In some cases, extra boxes may be purchased from the Service Department.

• Use plenty of foam so that the module is adequately protected, *ensuring the module is first placed in an anti-static bag.*

• Each module must be packaged in a box of its own, however, small boxes may be combined in a larger box for easier shipment.
  EXAMPLE: A Disk Mechanical Assembly must be packaged separately from a Disk Analog Board but the two small boxes may be shipped together in a larger box. In those cases where Apple has published a packaging assembly part number, that is the only acceptable packaging for that module (refer Service Policy Notices).

An Apple Service Repair Order Form (SRO) must be enclosed WITH EACH MODULE shipped to Apple.

All hard disk drives must be shipped only in Apple packaging. FAILURE TO DO SO will result in a $100.00 surcharge for each improperly packed hard disk module returned to the Service Department. In such cases, the packing material you will need may be ordered from Apple Service Department. The part numbers and the packing material are listed in *Apple Technical Procedure Binders* under *Illustrated Parts.*

2.6.3 SHIPPING

- Inward Goods - **The Reseller is responsible for all inward freight costs to Apple.**

- Outward Goods - Apple will pay outward freight costs. A courier of Apple's choice will be engaged. In most cases this will be an overnight shipment.

- Apple has an agreement with a courier company which is extended to all Apple resellers and service providers wishing to participate in the program. With the purchase of prepaid addressed air freight vouchers you may send items anywhere around Australia weighing less than 3 kgs at a cost of $6.00. These booklets are $120.00 each for 20 vouchers. The part number is **KAA** to order these prepaid booklets from your Apple Service Administration Specialist.

This is an ideal way for resellers to send their service parts etc. to Apple.

Continue with the next Section - Exercise : Packing and Shipping Instructions.

Exercise: Packing and Shipping Instructions

For items 1 through 5, indicate whether the statements are correct or incorrect by circling TRUE or FALSE

1. If a module is inoperable upon first use, you will need the packing slip (that came with the boxed module) for the warranty claim.

   TRUE   FALSE

2. When you ship modules to Apple, you can pack several small modules together in one box.

   TRUE   FALSE

3. After packaging several modules separately, you can ship them together in one larger box.

   TRUE   FALSE

4. An an SRO form covers more than one module.

   TRUE   FALSE

5. When packing modules, you need to add adequate padding to prevent shipping and ESD damage.

   TRUE   FALSE

6. If you fail to pack modules according to Apple's standards, Apple may bill you a surcharge.

   TRUE   FALSE

Exercise: Packing and Shipping Instructions

7. You must ship hard disks in Apple packaging or you may have to pay a surcharge.

   TRUE   FALSE

8. If Apple has listed a part number for a packaging assembly, you must use that packaging for the module indicated.

   TRUE   FALSE

Exercise: Packing and Shipping Instructions

Compare your answers to those provided on the next page.

Exercise: Packing and Shipping Instructions (Answers)

1. True

2. False - You must pack each module in a separate box. You can pack multiple boxes together in a larger box.

3. True

4. False - Currently, one SRO supports one Module. Pack each module in its own shipping box, if applicable, with the relavent SRO, then pack those boxes together in one larger box for shipping convenience.

5. True

6. True

7. True

8. True

If you missed any of these items, take time now to re-read *"Packing and Shipping Instructions."*

Otherwise ...

Continue with the next section - Ordering Parts.

Ordering Parts

When you do not obtain parts through the Apple Module Exchange program, you will have to order parts directly from Apple. The procedures and form for ordering parts are described in the *Apple Service Programs* manual.

To learn about these requirements, read the following pages which were reproduced from that manual.

3.1 HOW TO ORDER PARTS

3.1.1 AUTHORISATION

Apple Service are authorised to sell service materials only to those organisations that have valid authorised reseller agreements or other service provider agreements with Apple and have been issued with an Apple account number.

3.1.2 FINDING PARTS

It is strongly recommended that Apple service providers have all major parts in stock to repair the Apple product families they are authorised to sell, or will be offering service on. A complete listing of modules, parts, spares kits and training courses that you are able to order from Apple is listed in the prices section, which is listed by product type.

3.1.3 NEW PARTS

A. **ORDERING PARTS** - Apple service providers can order the required service materials from Apple Service Admin. Orders may be placed by mail or fax. All enquiries should be directed to Apple Service Administration in Sydney, or refer to Section 4, "APPLE SUPPORT CENTRE LOCATIONS".

NOTE: Standard Apple credit terms apply, and all claims for Sales Tax exemption must be made at time of order. See sample purchase order form.

B. **DISCOUNT AND TERMS** - Discounts apply only to authorised Level I Reseller Service Centres. Service stock, recommended Level I spares kits, replacement parts, other parts, exchange modules and tools & diagnostics do not attract normal Reseller discounts. Training is at list price.

C. **RETURNS** - Apple may accept returns of good service inventory of exchange modules, provided they are still being produced by Apple and are in good working condition. Apple will be the judge of whether or not the modules are in good working condition. Both the Reseller and Apple must agree on the return and you should contact Service Administration in Sydney before returning any such parts for credit. The reseller has the option to refuse this offer and thereafter use such parts as it sees fit.
Note; there is a twenty (20) % restocking, handling, inspection charge for all returns with a minimum of $50 on exchange and sales returns.

If a module is defective when received, Apple will reduce the amount of your refund by the "Exchange Price" of the module.

3.1.4 EXCHANGE PARTS

Selected modules may be repairable by Apple and are shown in the level 1 Price Book.

Subject to our terms and conditions Apple will receive these modules and exchange them for repaired parts/modules and at a fixed price as quoted in the Apple Service Price List Binder, or as updated from time to time. Turnaround time will normally be within two working days of receipt of the faulty module and subject to stock availability.

3.1.5 ADVANCED AND EXPEDITE EXCHANGES

Effective from February 1991, Apple will (optionally) ship all requests for exchange modules immediately we receive your written request (by Facsimile or mail), provided that adequate information is given to allow us to process your request. For requests sent prior to 14:00 (2pm) each working day, we will endeavour to ship same day. After 14:00 will be best effort to ship same day, else we will ship the next working day.

The defective module must be received by Apple within 15 calendar days from the date Apple ships the Advanced Exchange, or you will be charged for a Service Stock purchase. If the defective module is subsequently received after 15 calendar days, Apple will treat it as a separate exchange module transaction, and a replacement sent. You will not be credited the adjustment between the stock and exchange prices.

Modules shipped Advance Exchange are NOT returnable, except in special instances, in which case a restocking fee of 20% (minimum $50.00) may be charged.

Expedite Service: Where a module is required extremely urgently, Apple will process your request immediately, and will send the part by express courier. A fee of $50.00 + $10.00 for additional freight will apply. Apple will not be responsible for any subsequent courier or other delays outside of our control.

3.1.6 PRICING POLICIES

RRP and Fixed Repair Price are shown in the "Apple Service Price List Binder". Authorised dealers, Servicing Accounts and resellers pay the dealer price for service materials. All prices are subject to change without notice.

3.1.7 MINIMUM ORDER

There is a minimum billing on each parts order (currently $100.00 after all discounts, and excluding sales tax). Be sure to get your money's worth - don't place orders for less than the minimum. The minimum billing applies to each order that can be shipped to a single destination. (See Service Price List Binder, Level 1 Prices, "Definitions"). Sometime, however, you may need less than the minimum order. You can get what you need by specifying that you agree to pay an Admin plus freight fee (currently $25.00), plus a part cost minimum of $5.00 per line item after your applicable discount, ie. the minimum order value that Apple will process is currently $30.00 ($25.00+$5.00).

3.1.8 DISCOUNT ON NEW SERVICE MODULE ORDERS

You may be entitled to a discount on a new Service module order. Apple recognizes that Service Stock requirements represent a significant investment for Service Providers. Because customer satisfaction is our common goal, Apple wants to share the financial responsibility for providing this customer support. To minimize your financial burden and to help you provide excellent customer satisfaction on repair turnaround, Apple may discount your initial spares purchase for all orders placed within the first 90 days following a new product release. This applies to authorised level 1 service centres only.

Place Service Stock orders by fax or by mailing the New Module Discount Order Form to Customer Service Administration. Note: When placing your order for discounted new Service modules, indicate that this is your initial order and it should receive the discount, or use the sample parts order form.

3.1.9 SHIPPING

Parts will be shipped to resellers freight prepaid from Apple Support Centres. The most economical method of transport will be used.

Note: Special handling and shipping can generally be accommodated and will be charged to the requester.

3.1.10 USAGE AND ON-SELLING

The reseller agrees that the service materials, parts, and Exchange Modules sold to him by Apple are for his use in repairing Apple Products. The reseller will _not_ forward or on-sell Apple Service Stock, Replacement Parts, or Exchange Modules except in the course of legitimate repair of a customers Apple product, or where a formal agreement has been entered into with Apple which authorises such on-selling to specific accounts.

End users should be cautioned that if they buy parts and attempt a repair which causes damage to an Apple product, the warranty may be void.

All of the questions regarding invoices, payments, or parts received from Apple must be directed to your Apple Support Centre within thirty (30) days or as negotiated, of the receipt of the invoice, payment, or parts.

excerpt from "Apple Service Programs manual"

APPLE CUSTOMER SERVICE
NEW MODULE DISCOUNT ORDER FORM - SEPTEMBER, 1990

TERMS AND CONDITIONS: Apple will discount your Service Stock purchase of the modules listed below by an additional 20% if your order is received by December 1, 1990 (limit one per service location). All terms and conditions in your written agreement with Apple Computer, Australia Pty Ltd. shall apply to this order. Any other terms shall have no force or effect.

BILL-TO INFORMATION

Apple Sales Order N# _____

P.O. # _____

Reseller N#

Name

Address

| City | State | Post Code |

SHIP-TO INFORMATION

Name

Address

| City | State | Post Code |

Service Manager

Technician

AppleLink Address

Qty	Part #	Description	Svc Stock Unit Price	Discounted Unit Price	Unit Savings	√ To Order
1	661-0607	Macintosh Display Card 4•8	1143.30	914.68	228.32	
1	661-0609	VRAM SIMM 256K, 100ns	240.30	192.25	47.75	

☐ Sales Tax exempt

I certify that
is the holder of Sales Tax Certificate No .
and is exempt from Sales Tax on this order:

Sub Total $ _____

Tax (If Applicable) _____

Total $ _____

Requested by: _____

Signature: _____   Date: _____

Please make a copy of the completed form and retain it for your own records.

apple computer excerpt from "Apple Service Programs manual"

APPLE AUTHORISED SERVICE CENTRE
PARTS ORDER FORM

Dealer Name _____   Date _____ / _____ / _____

Dealer Account # _____   P.O. # _____

Requested By _____   Sales Order No _____

Bill To _____   Ship To: _____

Address _____   _____

_____   _____

_____   _____

Special Instructions:

Item #	Quantity	P/N	Description	Unit Price	Total Price

☐ Sales Tax exempt

Sub Total $ _____
Tax (if applicabple $ _____
Total Charges $ _____

I certify that
is the holder of Sales Tax Certificate No .
and is exempt from Sales Tax on this order:

Signature: _____

Exercise : Ordering Parts

Answer the following items as indicated. Some require that you write an answer. If answer options are given, circle the correct answer(s).

1. In which manual can you find a list of all the service materials available from Apple?

   Manual name _____

2. When ordering parts from Apple, what is the minimum dollar amount that you can order at one time?

   _____

3. Is there any restriction on returning items to Apple? Circle all correct answers.

   A. You can return unused items to Apple at any time.
   B. You can return any unused items to Apple within 90 days of receiving them.
   C. You can return only unused items that were shipped to you in error.
   D. You must have authorization to return a product to Apple.
   E. You cannot return any items to Apple.

4. If an exchange module is sent to you in advance, within how many days do you have to the defective part to Apple?

   _____ days

5. Which of the following are valid methods of ordering Parts :

   A. On an SRO form
   B. By mail on a Parts Order form
   C. By telephone
   D. By FAX on a Parts Order form
   E. In person

Exercise : Ordering Parts

Compare your answers with those provided on the next page.

Exercise : Ordering Parts (Answers)

Compare your answers to the ones below.

1. Service Price List

2. $100

3. C. You can return only unused items that were shipped to you in error.

    D. You must have authorization from your Support Center to return a product.

4. within 15 days

5. B.

    D.

If you missed any of these items, review the section entitled *Ordering Parts.*

Otherwise ...

Continue with the next section - Module Summary.

Module Summary

What Have You Learned In This Module?

In this module, you learned how to meet your administrative responsibilities with regard to The Apple Limited Warranty, the Apple Exchange Programs, AppleCare, and the Parts Ordering process. You now know how to determine whether or not products are covered under the Limited Warranty program or AppleCare, and whether or not modules qualify for exchange. You also know how to fill out the Apple Service Repair Order (SRO), the AppleCare Order Form, and the Parts Order Form.

Some of the key points from this module are highlighted below.

Warranty Status

When you service Apple products, one of your responsibilities is to determine whether or not the product is covered by the Apple Limited Warranty or AppleCare Service Plan. You need to obtain proof of coverage. Then, as you repair the product, you need to determine whether the type of service you performed is covered by the warranty or service plan.

Service Repair Order

If you are going to send a defective part in to Apple or seek warranty reimbursement from Apple, you need to document your repair work by filling out the SRO form. This requires that you:

• Provide complete information from the customer.
• Document the equipment received and the parts serviced.
• Document what you did to repair the product(s).
• Determine your reimbursement from Apple.

You must fill out one SRO for each serialized product. The SRO must be completed thoroughly and accurately. If you fail to do so, Apple will process the transaction as Out of Warranty.

If you are returning a defective part to Apple, you need to send an SRO form with the part.

Module Exchange Program

You can save money for your service department and for your customers if you take full advantage of Apple's Exchange Program. If you determine that a defective module qualifies for exchange, you can obtain a replacement module at a reduced price. All you need to do is to package the module according to the directions provided by Apple. Be careful — failure to properly pack parts may result in a surcharge.

Module Summary

Parts Order Form

If you do not send in defective parts, you will probably have to order parts. You can send in the Parts Order Form by mail or by FAX.

AppleCare

AppleCare can greatly increase the profitability of your dealership. Not only does your dealership receive a high margin on each AppleCare contract sold, but you are generously reimbursed for parts and labor on every repair covered by AppleCare.

What are your responsibilities with regard to this extended maintenance program? First, you can promote the program to your customers. Second, if a customer selects the program for old equipment, you need to inspect the equipment to ensure it is in acceptable condition. Third, if the customer buys the coverage, you need to fill out the AppleCare Order Form.

You have completed this module.

Check your skills and knowledge against the Skills Checklist. When you are ready, take the Module Test.

Module Test

This test consists of different types of questions. Answer each item as directed. You may refer to the information provided in the module as necessary.

Directions

For items 1 through 6, decide whether or not the service described will be covered under the Apple Limited Warranty. Indicate your decision by checking YES or NO. If you select NO, explain why the service would not be covered by the Limited Warranty.

1. Mike Reed has returned his Apple IIc to your Apple shop, where he purchased it two months ago. He says that there are problems with the keyboard. When he strikes certain keys, nothing registers on the video display.

   As you examine his system, you notice that a sticky substance has been spilled all over the keyboard. You suspect it is Coca Cola.

   Is the servicing covered under Apple's Limited Warranty?

   ___ YES   ___ NO

   If you selected NO, explain why:_____

   _____

2. Julie Green has returned her Apple IIGS system to your dealership, where she purchased it last month. The only item that is not functioning is the Dick Smith (non-Apple) monitor she bought to use with her system.

   Is the servicing covered under Apple's Limited Warranty?

   ___ YES   ___ NO

   If you selected NO, explain why:_____

   _____

Module Test

3. Tim Smith, who recently moved to the Australia, has brought in his Macintosh Plus and Macintosh 800K External Drive. He purchased the system two months ago in Canada and reports that he cannot boot disks in the external drive. After checking the system, you find that there is a problem with the drive mechanical assembly that could not have been caused by user abuse.

   Is the servicing covered in Australia under Apple's Limited Warranty?

   __ YES   __ NO

   If you selected NO, explain why:_____

   _____

4. Sharon Martin, who bought an Apple IIe along with an ImageWriter II and an Apple Super Serial Card from you last week, has returned her system. She says she can't get the printer to print. You are unable to run the Apple II Peripherals Diskette diagnostic tests for the ImageWriter II. When you substitute a known-good Super Serial Card, the printer works. You conclude that the Super Serial Card is bad.

   Is the servicing covered under Apple's Limited Warranty?

   __ YES   __ NO

   If you selected NO, explain why:_____

   _____

5. Frank Jones has returned his Macintosh Plus, which is still covered under the Limited Warranty, to you. Frank says his system will not work at home, but you run the diagnostics and find that the system works fine at your center. You and Frank trace the problem to a "noisy" power line at his home.

   Is the servicing covered under Apple's Limited Warranty?

   __ YES   __ NO

   If you selected NO, explain why:_____

   _____

Module Test

6. Jeanne Williams, who purchased some Macintosh-compatible software four months ago, has brought the software to you, saying that it will not boot. However, her other software boots without problem.

   Is the servicing covered under Apple's Limited Warranty?

   ___ YES   ___ NO

   If you selected NO, explain why:_____

   _____

Directions

Items 7 through 13 deal with AppleCare. Answer them as indicated.

7. Which of the following are reasons for promoting AppleCare to your customers? Check all the correct answers.

   ___ A. It saves money for the customer.
   ___ B. Your dealership earns a 50% margin on each AppleCare contract.
   ___ C. Your dealership receives generous reimbursements for parts and labor on AppleCare repairs.
   ___ D. You can use the Apple Exchange Program only for products covered by the Limited Warranty or by AppleCare.

8. Describe two situations in which you, an Apple Service Technician, might promote AppleCare to customers.

   a. _____

   _____

   b. _____

   _____

Module Test

9. Joan Hampton wants to buy AppleCare to cover the equipment listed below. Check the items that would not be covered automatically by the "system coverage" but would cost additional. Do not check the items that would be included as part of the system.

__ Macintosh SE
__ 2 MB of RAM
__ Apple Extended Keyboard
__ Apple Desktop Bus Mouse
__ Apple Personal Modem
__ External Hard Disk 20SC
__ Xyber (non-Apple) memory card
__ Apple ADB keyboard cable
__ LaserWriter II

10. Mary Jones has upgraded her Apple IIe to an Apple IIGS. Six months remain in her current AppleCare contract. Which of the following statements apply to this situation?

A. She needs a new AppleCare contract to cover the upgraded system, and she will be refunded for the remaining months of her old contract.
B. She needs a new AppleCare contract, but can have it at no charge.
C. The upgraded system will be covered under the existing AppleCare contract, but with a minimal "upgrade" charge.
D. The upgraded system will be covered under the existing AppleCare contract, with no extra charge.

11. Within how many days after filling out an AppleCare Order Form for a customer should you send a copy of the form in to Apple?

within _____ days

12. What is the minimum and maximum number of months that an AppleCare policy can cover?

minimum = _____ months

maximum = _____ months

Module Test

13. What should you do to determine whether or not old Apple hardware products qualify for AppleCare coverage?

_____

Directions

In Items 14 through 21, Indicate whether or not the products meet Apple's exchange criteria for modules. Indicate your answers by checking YES or NO. If you check NO, explain why.

14. You find that the malfunctioning logic board of Joe Matthew's Macintosh has been "upgraded" by non-standard RAM chips that have been soldered on. Does it meet Apple's module exchange criteria?

___ YES   ___ NO

If you selected NO, explain why:_____

_____

15. You diagnose the problem with the insurance company's ImageWriter II as a malfunctioning print head. Does it meet Apple's module exchange criteria?

___ YES   ___ NO

If you selected NO, explain why:_____

_____

16. Kathryn Bollinger brings in an Apple IIe that will not boot. You replace the power supply, which has been altered at the component level. Does it meet Apple's module exchange criteria?

___ YES   ___ NO

If you selected NO, explain why:_____

_____

Module Test

17. Dan Phillips brings in his Apple 5.25 Drive, which has a cracked analog card. Does it meet Apple's module exchange criteria?

  __ YES   __ NO

If you selected NO, explain why:_____

_____

18. John Baker's AppleColor Composite Monitor IIe is emitting a high-pitched noise. You replace the main logic PCB. Does it meet Apple's module exchange criteria?

  __ YES   __ NO

If you selected NO, explain why:_____

_____

19. You find that the load pads on the school's Disk II are jammed with a sticky substance. Does it meet Apple's module exchange criteria?

  __ YES   __ NO

If you selected NO, explain why:_____

_____

20. Tom Smith's Macintosh SE internal disk drive fails MacTest SE. You replace the drive mechanism. Does it meet Apple's module exchange criteria?

  __ YES   __ NO

If you selected NO, explain why:_____

_____

Module Test

21. You find that the carriage wires of Tim Reynolds' Apple 5.25 Drive are nicked. Does it meet Apple's module exchange criteria?

___ YES   ___ NO

If you selected NO, explain why:_____

_____

Directions   **Items 22 through 27 deal with the Apple exchange programs and other miscellaneous administrative tasks. Answer as indicated.**

22. Briefly describe how the Module Exchange Program works.

_____

_____

_____

_____

_____

_____

23. You have received an Advanced Exchange module. Within how many days after the date Apple shipped it should you send the defective part to Apple?

_____ days

Module Test

24. If you do not provide complete or correct information on the SRO form, Apple will process the transaction as an Out of Warranty transaction. If this happens, what you should do to correct the situation? Check the correct answer.

___ A. Forget it. There is nothing you can do.

___ B. Call your Apple Support Center within ninety days.

___ C. Complete or correct the original form and send it back in.

___ D. Fill out a new SRO form and send it in.

25. Which of the following statements are true with regard to packing modules and parts that you plan to ship to Apple? Check each statement that is true.

___ A. You should pack each module in its original packing box, if possible.

___ B. You can pack more than one small module together in one box.

___ C. You can pack several boxes together for shipping.

___ D. You must pack hard disks in Apple packaging specially designed for shipping hard disks.

___ E. You must ship only one module per SRO form, unless the modules came from the same CPU or peripheral.

26. You need to order some parts from Apple. What is the minimum dollar amount that you can order?

_____ dollars

Module Test

27. You have received too many inventory products from Apple. Can you return any of the items to Apple? Check the correct answer.

    ___ A. You cannot return any items to Apple.
    ___ B. You can return only unused items that were shipped to you in error.
    ___ C. You can return any unused items to Apple within 120 days of receiving them.
    ___ D. You can return unused items to Apple at any time.

SRO Form Directions

In this part of the test, you will fill out a Service Repair Order (SRO) for Case 1 described on the next page.

1. Read the description of Case 1.

2. Locate the blank SRO forms on the pages following the case. Write in pencil in case you need to redo the forms.

3. Fill in the form(s) with the information provided.
   - Refer to the Course materials as necessary.
   - Sign your own name as the person who did the repair.
   - Use "Today's Date"

Module Test

Case 1

Customer: Mark Meywortz   02/452-8000 (BH)
                42 Howard Pde,   02/982-0008 (AH)
                Dee Why,
                NSW. 2099   Customer Number : 420531

He is covered under AppleCare Agreement number 3142536 until the 17th of next month. Today Mr. Meywortz brought in the following system, which he purchased on October 17, 1985. :

Apple IIe	S/N 71482075	Model/N A2S2128
Monitor II	S/N 562901	Model/N A2M2010
DuoDisk	S/N 144426	Model/N A2P2029

He says the system is dead. It won't boot, has no video, and doesn't beep. Before the system failed, he was getting many I/O messages from DuoDisk Drive 2.

After you replace the power supply, (use exchange module 661-71160 "POWER SUPPLY, AIIE, 220V", Exchange Price $109.32), the system passes the *Apple II Diagnostics 2.0.* Using the *Module Symptom Codes* in the Technical Procedures, you enter code 5071 on the SRO for the Power Supply.

You then run all the tests on the DuoDisk using the *Apple 5.25 Floppy Drive Test Assembly version 1.0* on both drives in the DuoDisk. Drive 1 tests out perfectly but the DSPEED test indicates that Drive 2 has an incorrect drive speed. The diagnostic returns a *Repair Confirmation Code* of 1203-9753 for Drive 2. After adjusting the disk speed of Drive 2, the system functions perfectly.

Using the 3 teir pricing schedule as per Service Programs Binder, you enter $115.00 labour reimbursment for the CPU repair and $75.00 for the drive adjustment.

You inform Mark that his system will be ready tomorrow.

SRO Form for Case 1

Service Repair Order

Apple Computer Australia Pty. Ltd.

SRO #

SRO #

| Office Use Only | ___ / ___ / ___ | S/O NO: | RMA NO: |

1 Reseller Details

Reseller Account No.:

Reseller Name:

Address:

Suburb   State   Post Code   ( ) Phone No.

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

* Customer No.:

Customer Name:

Address:

Suburb   State   Post Code   ( ) Phone No.

3 Product Details

| Product Requiring Service | Model Number | Product/System Serial No. |

Date Received:

Other Information:

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: ___ / ___ / ___

| ☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ___ / ___ / ___ INOPERABLE UPON FIRST USE: ☐ YES ☐ NO | ☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER: | ☐ AppleCare EQUIPMENT PURCHASE DATE: ___ / ___ / ___ AGREEMENT NUMBER: EXPIRATION DATE: ___ / ___ / ___ | ☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO: DATE: ___ / ___ / ___ | ☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO: DATE: ___ / ___ / ___ |

☐ OTHER:

FAULT: _____

_____

_____

_____

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount

Repaired By: _____ Date: ___ / ___ / ___

Customer Signature: _____ ___ / ___

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: _____

Total Parts	
Sales Tax	
Labour Hours X Rate	
Travel X	
Freight:	
Total	

6 Shipping Details

Part No Shipped	Date Shipped	Consign. Note No	Courier
661 -	___ / ___ / ___		

SRO Form for Case 1

Service Repair Order

Apple Computer Australia Pty. Ltd.

SRO #

SRO #

Office Use Only	___ / ___ / ___	S/O NO:	RMA NO.

1 Reseller Details

Reseller Account No.:

Reseller Name:

Address:

	Suburb	State	Post Code	( ) Phone No.

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

* Customer No.:

Customer Name:

Address:

	Suburb	State	Post Code	( ) Phone No.

3 Product Details

Product Requiring Service	Model Number	Product/System Serial No.

Date Received:

Other Information:

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION - Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: ___ / ___ / ___

☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ___ / ___ / ___ INOPERABLE UPON FIRST USE: ☐ YES ☐ NO	☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER	☐ AppleCare EQUIPMENT PURCHASE DATE: ___ / ___ AGREEMENT NUMBER EXPIRATION DATE ___ / ___	☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO DATE ___ / ___ / ___	☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO: DATE ___ / ___

☐ OTHER:

FAULT: _____

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
			[ ]-[ ]-[ ]	
			[ ]-[ ]-[ ]	
			[ ]-[ ]-[ ]	
			[ ]-[ ]-[ ]	

Repaired By: _____ Date: ___ / ___

Customer Signature: _____ ___ / ___

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: _____

Total Parts	
Sales Tax	
Labour Hrs X	
Travel X	
Freight:	
Total	

6 Shipping Details

Part No Shipped	Date Shipped	Consign. Note No.	Courier
661 -	___ / ___		

Module Test

AppleCare Form Directions

In this part of the test, you will fill out an AppleCare Service Plan Order Form for two cases.

1. Locate the blank AppleCare Order Forms following the cases. Write in pencil in case you need to redo them.

2. Read the description of the cases presented below.

3. Fill in the forms with the information provided.

   - Refer to the Course Materials as necessary.
   - You will find an AppleCare Price List in the AppleCare section of this module. (Apple Service Administration).

Case 1

Today is ...... (use Today's Date) and you are selling Arthur Dent an AppleCare insurance policy. His Apple IIGS 1mB system includes an Apple 3.5 Disk Drive, an ImageWriter II printer, and an Apple Monochrome Monitor. As his Warranty is about to expire, Arthur wants to buy a one year AppleCare Service Plan to cover his system that you sold him a year ago. Arthur's Customer Number is 630042 and existing Warranty Contract Number is 945739.

Information you need to know:

Arthur Dent	Apple IIGS (1mB)	S/N 2020014
12 Hubert St.	Apple 3.5 Drive	S/N 536225
Leichhardt,	ImageWriter II	S/N 469042
NSW, 2040	IIGS Mono. Monitor	S/N 016789
Phone: (02) 560 4660 AH		
(02) 662 4537 BH		

Note: Sales tax does not apply.

Case 2

Six months later to the day : Arthur has returned to your store with a second hand AppleColor RGB Monitor (S/N 361235) he purchased for his IIGS system. He wants the monitor covered under an AppleCare Service Plan so that it will expire at the same time as his other coverage. You inspect his monitor which seems to be free of unauthorised tampering and decide it is suitable for coverage under AppleCare. His existing AppleCare Contract number is 457623.

Arthur has moved since his first AppleCare purchase — his new address is :
42 Beetlejuice Rd, Ultimo, NSW, 2001. His new phone number is (02) 212 2752.

APPLE*CARE* Form (for Case 1)

AppleCare Registration Form

Your details
(Please complete fully and accurately.)

Client Number: ☐☐☐☐☐☐ ◀ Note: If you have an Apple Client number and/or a Contract number, please insert here. ▶ Expiring Contract Number: ☐☐☐☐☐☐☐

Purchase or Contact Name: Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Given Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Initial: ☐

Department or Title: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company Name or School ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Address _____

_____ P/Code. _____

Country: _____ Phone Business: _____ Phone Private: _____

Authorised Apple Reseller information

Reseller Name. _____ Suburb: _____

Reseller Number: _____ Salesperson Name: _____ Contract Start Date: _____

Equipment purchase date: *_____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature. _____ Date. _____

Reseller Name. _____

Equipment covered

AppleCare Part No	Product Description	Product Serial Nos	No. of Months	Cost per Month	Total cost (Undiscounted)

(AppleCare part no , product description and monthly pricing are shown on Price Card)

Total Amount: $_____
Less Discount (if applicable) $_____
AMOUNT DUE: $_____

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ Date _____
Client Signature

Payment authority

I have enclosed my cheque for $_____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box)

Expiry Date. ___/___/___ Card No: _____

Cardholder Name. _____ Cardholder Signature: X_____

APPLE*CARE* Form (for Case 2)

AppleCare Registration Form

Your details
(Please complete
fully and
accurately.)

Client Number: ☐☐☐☐☐☐ ◄ Note: If you have an Apple Client number and/or a Contract number, please insert here. ► Expiring Contract Number: ☐☐☐☐☐☐

Purchase or Contact Name: Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Given Name: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Initial: ☐

Department or Title: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Company Name or School: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Address: _____

_____ P/Code: _____

Country: _____ Phone Business: _____ Phone Private: _____

Authorised Apple
Reseller information

Reseller Name: _____ Suburb: _____

Reseller Number: _____ Salesperson Name: _____ Contract Start Date: _____

Equipment purchase date:* _____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following.
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: _____ Date: _____

Reseller Name: _____

Equipment covered

AppleCare Part No	Product Description	Product Serial Nos	No. of Months	Cost per Month	Total cost (Undiscounted)

(AppleCare part no , product description and monthly pricing are shown on Price Card)

Total Amount:	$
Less Discount (if applicable)	$
AMOUNT DUE:	$

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms
and Conditions described in this brochure. _____ Date _____
Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty. Ltd
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box)

Expiry Date: ___/___/___ Card No: _____

Cardholder Name: _____ Cardholder Signature: __X_____

Module Test

That is the end of the Module Test. You may want to go back over the questions to check your answers.

When you are ready, compare your answers to those on following answer pages.

Module Test (Answers)

Compare your answers to the ones below.

1. No. The sticky substance on the keyboard is the "key" to this case. The Apple Limited Warranty is voided for this particular repair because the damage to the keyboard is the result of customer abuse.

2. No. The warranty does not apply in this case because the only item malfunctioning is the Dick Smith Monitor, a non-Apple peripheral.

3. No. The repair is not covered because the Apple Limited Warranty is valid only in Australia, New Zealand, Papua New Guinea, Fiji, Vanuatu and the Solomon Islands. The customer could have his system repaired in Australia, but would be required to pay as any customer without Warranty. He would however, be able to claim repair costs under Warranty from Apple Resellers in Canada by providing the Australian receipt(s) and or SRO(s) as proof of repair.

4. Yes. Servicing will be done under the Apple Limited Warranty. An Apple product, the Super Serial Card, is faulty and there are no signs of customer abuse.

5. No. The warranty does not apply, as the problem with Frank's Macintosh is a "noisy" power line, which is outside the system.

6. No. Software is not covered under the Apple Limited Warranty (and even if it were, the warranty period would have elapsed).

7. A, B, and C

8. Here are two situations in which you could promote AppleCare to customers:
   a. When you return equipment to a customer after repairing it.
   b. When a customer asks you for technical advice or information.

   You may have thought of some additional situations. That's great!

9.
   _____ Macintosh SE
   _____ 2 MB of RAM
   _____ Apple Extended Keyboard
   _____ Apple Desktop Bus Mouse
   _X_ Apple Personal Modem
   _X_ external Apple Hard Disk 20SC
   _X_ Third-party (Non-Apple) memory card
   _____ Apple ADB keyboard cable
   _X_ LaserWriter II NT

Module Test (Answers)

10. D

11. within 14 days

12. minimum = 12 months
    maximum = 36 months

13. Before you can sell AppleCare for old Apple equipment, you must inspect it to ensure it's in good condition.

14. No. You cannot exchange this logic board. It is considered "non-repairable" because non-standard RAM chips have been soldered on.

15. No. Although this item has a part number 661-0316, it is listed as a spare part in the Service Price List.

16. No. You cannot exchange the power supply because it has been altered.

17. No. You cannot exchange the analog card because it is cracked and therefore is considered "unrepairable."

18. Yes. You can exchange the PCB because there is no evidence of modification or damage. It is considered "repairable."

19. No. You cannot exchange a module that has evidence of any foreign substance such as soft drinks.

20. Yes. You can exchange the drive mechanism because there is no evidence of damage or modification.

21. No. You cannot exchange the module because of the visible damage (nicks in the wires).

22. The key points of the Apple Module Exchange Program are these:
    - You buy an initial service module at the stock price.
    - When repairing a system, you replace a faulty module with the service module from your inventory.
    - You send the faulty module back to Apple for repair.
    - Apple sends you a functional module of the same type and charges you the exchange price.
    - You place the new module back in your inventory.

Module Test (Answers)

23. 15 days

24. C

25. A, C, D, E

26. $100

27. B. And you must have authorization to return the items.

Compare your completed SRO forms and AppleCare forms to the ones on the following pages.

SRO Form (answer for Case 1)

Service Repair Order

Apple Computer Australia Pty. Ltd.

SRO #

SRO #

Office Use Only	___/___/___	S/O NO:		RMA NO:

1 Reseller Details

Reseller Account No.: *'Your Reseller Account No.'*

Reseller Name: *'Your Reseller Name.'*

Address: *'Your Reseller Address.'*

Suburb · State · Post Code · Phone No.

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

• Customer No.: 420531

Customer Name: *Mark Meyrwortz*

Address: *42 Howard Pde.*

Dee Why		*N.S.W.*	2099	*(02) 452 8000*
Suburb		State	Post Code	Phone No.

3 Product Details

Product Requiring Service	Model Number	Product/System Serial No.
Apple IIe	*A2S2128*	*71482075*

Date Received: *'Today's Date.'*   Other Information: _____

4 Repair Information -

IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: ___ ___ ___

☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: ___ INOPERABLE UPON FIRST USE: ☐ YES ☐ NO	☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER: ||||||||||	☒ AppleCare EQUIPMENT PURCHASE DATE: _17_/_10_/_85_ AGREEMENT NUMBER: |3|1|4|2|5|3|6| EXPIRATION DATE: ___/___/___	☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: |||||||||| DATE: ___/___/___	☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO.: ||| |||||||| ||| DATE: ___/___/___

☐ OTHER:

FAULT: *'No Video, No Beep and Won't Boot.'*
System Dead.

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
1	661-71160	*Power Supply, IIe, 220 V*	|5|0|7|1|-|||||-|||	*$109.32*
			||||||-|||||-|||	
			||||||-|||||-|||	
			||||||-|||||-|||	

Repaired By: *'Your Name'* Date: *'Today's Date.'*

Customer Signature: XXXXXXXXXXXX *'Tomorrow.'* Equipment Pick Up Date

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: *'Your Signature'*

Total Parts		*No Charge*
Sales Tax		
Labour Hours X		*AppleCare $115.00*
Travel X		
Freight		
Total		*$224.32*

6 Shipping Details

Part No. Shipped	Date Shipped	Consign. Note No.	Courier
661 -	___/___/___		

SRO Form (answer for case 1)

Service Repair Order

Apple Computer Australia Pty. Ltd.

SRO # _____   SRO # _____

Office Use Only	___ / ___ / ___	S/O NO:	RMA NO:

1 Reseller Details

Reseller Account No.: *'Your Reseller Account No.'*

Reseller Name: *'Your Reseller Name.'*

Address: *'Your Reseller Address.'*

| Suburb | State | Post Code | Phone No. |

2 Customer Details • If Customer Has An Apple Customer Number Please Insert Here

* Customer No.: **420531**

Customer Name: *Mark Meywortz*

Address: *42 Howard Pde.*

| *Dee Why* | *N.S.W.* | *2099* | *(02) 452 8000* |
| Suburb | State | Post Code | Phone No. |

3 Product Details

Product Requiring Service	Model Number	Product/System Serial No.
DuoDisk	*A2P2029*	*144426*

Date Received: *'Today's Date.'*   Other Information: _____

4 Repair Information - IF THIS IS A WARRANTY OR APPLECARE CLAIM-PROOF OF PURCHASE OR A COPY OF THE WARRANTY CERTIFICATE OR APPLECARE MUST BE ATTACHED TO THE BACK OF THE SERVICE REPAIR ORDER.

WARRANTY INFORMATION -Tick Only One Box in this Section.

☐ OUT OF WARRANTY   PURCHASE/UPGRADE DATE: _

☐ APPLE LIMITED PRODUCT WARRANTY (REQUIRES PROOF OF PURCHASE ON FILE) PURCHASE/UPGRADE DATE: INOPERABLE UPON FIRST USE: ☐ YES ☐ NO	☐ REPAIR MATERIAL AUTHORIZATION (RMA) NUMBER: |_|_|_|_|_|_|_|_|	☒ AppleCare EQUIPMENT PURCHASE DATE: _17_/_10_/_85_ AGREEMENT NUMBER: |3|1|4|2|5|3|6|_| EXPIRATION DATE: ___/___	☐ LIMITED REPEAT SERVICE WARRANTY ORIGINAL SRO NO.: |_|_|_|_|_|_|_|_| DATE: ___/___/___	☐ SERVICE STOCK INOPERABLE UPON FIRST USE. RECEIVED ON SALES ORDER NO.: |_|_| |_|_|_|_|_|_|_| |_|_|_| DATE: ___/___/___

☐ OTHER:

FAULT: *'Too many I/O errors from Drive #2.'*
Incorrect Drive speed.
Drive Diagnostic 'Apple 5.25 Floppy Drive Test. Ver. 1.0' used.

5 Parts

QTY.	Part No.	Description	Repair Confirmation Code / System Code	Amount
1	-	*Adjust Drive Speed*	|1|2|0|3|-|9|7|5|3|-|_|_|	-
			|_|_|_|_|_|-|_|_|_|_|-|_|_|	
			|_|_|_|_|_|-|_|_|_|_|-|_|_|	
			|_|_|_|_|_|-|_|_|_|_|-|_|_|	

Repaired By: *'Your Name'*   Date: *'Today's Date.'*

Customer Signature: *XXXXXXXXXXXX*   *'Tomorrow.'* Equipment Pick Up Date

I hereby claim reimbursement from Apple Computer for the repair of Apple products covered by Warranty or AppleCare and have attached the customer's proof of purchase or copy of the Warranty certificate or AppleCare agreement or otherwise.

RESELLER SIGNATURE: *'Your Signature'*

Total Parts		
Sales Tax		
Labour Hours X		
Travel X		*$75.00*
Freight		
Total		*$75.00*

(AppleCare - No Charge)

6 Shipping Details

Part No. Shipped	Date Shipped	Consign. Note No.	Courier
661 -	___/___/___		

APPLE*CARE* Form (Case 1 answer)

AppleCare Registration Form

*Your details
(Please complete
fully and
accurately.)*

Client Number: `6 3 0 0 4 2` ◀ Note: If you have an Apple Client number and/or a Contract number, please insert here ▶ Expiring Contract Number: `9 4 5 7 3 9`

Purchase or Contact Name: Mr `X` Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: `D E N T`

Given Name: `A R T H U R` Initial: ☐

Department or Title: [ ]

Company Name or School: [ ]

Address: __12 HUBERT ST.   LEICHHARDT   N.S.W.__

P/Code: __2040__

Country: __AUSTRALIA__ Phone Business: __(02) 662 4537__ Phone Private: __(02) 560 4660__

Authorised Apple Reseller information

Reseller Name: __'Your Reseller Name'__ Suburb: __'Your Suburb'__

Reseller Number: __'Your No.'__ Salesperson Name: __'Your Name'__ Contract Start Date: __'Today's Date'__

Equipment purchase date: _____ *(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: _____ Date: _____

Reseller Name: _____

Equipment covered

AppleCare Part No.	Product Description	Product Serial No.	No. of Months	Cost per Month	Total cost (Undiscounted)
280	Apple IIGS (1mB)	2020014	12	$12.00	144.00
43	Apple 3.5 Drive	536225	12	$4.50	54.00
24	IIGS Mono. Monitor	016789	12	$4.00	48.00
60	IMAGEWRITER II	469042	12	$6.00	72.00

(AppleCare part no., product descriptions and monthly pricing are shown a on Price Card.)

Total Amount: $ *318.00*

Less Discount (if applicable): $ —

AMOUNT DUE: $ *318.00*

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ *X X X X X X X* _____ Date __'Today's Date'__

Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: __/__/__ Card No.: _____

Cardholder Name: _____ Cardholder Signature: __X__ _____

APPLE*CARE* Form (Case 2 answer)

AppleCare Registration Form

Client Number: 6 3 0 0 4 2 ◀ Note: If you have an Apple Client number and/or a Contract number, please insert here. ▶ Expiring Contract Number: 4 5 7 6 2 3

Purchase or Contact Name: Mr X Mrs ☐ Miss ☐ Ms ☐ Other _____ Surname: D E N T

Given Name: A R T H U R Initial: ☐

Department or Title:

Company Name or School:

Address: 42 Beetlejuice Rd.   ULTIMO   N.S.W.

P/Code: 2001

Country: AUSTRALIA Phone Business: (02) 662 4537 Phone Private: (02) 212 2752

Authorised Apple Reseller information

Reseller Name: 'Your Reseller Name' Suburb: 'Your Suburb'

Reseller Number: 'Your No.' Salesperson Name: 'Your Name' Contact Start Date: '6 Months from Today'

Equipment purchase date:' _____ '(Only applicable if participating in purchase with original sales programme.)

If equipment is currently out of warranty or AppleCare cover please have your Reseller complete the following:
The Equipment listed below has been tested and found to be in good working order and suitable for AppleCare coverage

Technician/Engineer Signature: 'Your Signature' Date:. '6 Months from Today'

Reseller Name: 'Your Reseller Name'

Equipment covered

AppleCare Part No.	Product Description	Product Serial Nos.	No. of Months	Cost per Month	Total cost (Undiscounted)
25	IIGS RGB Color Monitor	361235	6	$5.00	30.00

(AppleCare part no., product descriptions and monthly pricing are shown on the Price Card.)

Total Amount: $ 30.00

Less Discount (if applicable): $ —

AMOUNT DUE: $ 30.00

(Important: AppleCare MUST be taken out for a minimum of twelve (12) months unless it is being consolidated with another contract.)

I have read and agree to the AppleCare Terms and Conditions described in this brochure. _____ X X X X X X X _____ Date. '6 Months from Today'
Client Signature

Payment authority

I have enclosed my cheque for $ _____ payable to Apple Computer Australia Pty. Ltd.
or charge to Visa ☐ Bankcard ☐ Mastercard ☐ AppleCard ☐ (Tick box).

Expiry Date: __/__/__ Card No: _____

Cardholder Name: _____ Cardholder Signature: X _____

Module Test

Congratulations ! You have completed the module. Be sure you can perform all of the tasks listed on the Skills Checklist before attending the Prerequisite Exam and the Lab part of this course.

MACINTOSH SERVICE COURSE

SYSTEM 7 ADDENDUM TO THE PREREQUISITE MANUAL - VOLUME 2

SERVICE TRAINING

PARTICIPANT

OCTOBER 1991

Using System 7
Table of Contents

Module Introduction

Overview

System Software 7.0 represents many changes in the way you work with the Macintosh. Several aspects of the Macintosh operating system have changed between System 6 and System 7. You may find the need to support both operating systems. Therefore it is important to understand the basic concepts of using a Macintosh running System 6 before learning the new features associated with System 7.

Note: System 6.0 and all subsequent releases will be referred to as System 6. System 7.0 and all subsequent releases will be referred to as System 7.

What You Will Learn

By the end of the module, you should be able to:

* Identify some of the key differences between System Software 6 and System Software 7.
* Perform each of the steps necessary to successfully install System 7.
* Demonstrate your ability to utilize the System 7 features of the desktop.
* Customize and control the Macintosh environment using the System 7 features of the System Folder
* Configure memory for any System 7 Macintosh
* Define and describe File Sharing as implemented in System 7.
* Define and describe Publish and Subscribe as implemented in System 7.
* List possible solutions for System INIT conflicts

How you will Be Tested

The Module Test This written test will help you verify that you can perform the tasks outlined in the Skills Checklist.

Prerequisite Exam This exam consists of hands-on and written items. It will verify that you have mastered the module skills listed and are ready for the lab part of this course.

Prerequisites to the Module

Before beginning this module, you must have satisfactorily completed these modules:

From Prerequisite Volume 1
* Welcome to Apple Service
* Understanding ESD
* Macintosh Basic Features
* Setting Up Macintosh Computers
* Using Macintosh Computers

From Prerequisite Volume 2
* Apple Hard Disk SC

Materials Needed for This Module

The Prerequisite provides the following items for this module:

- This Module Workbook
- Module Test

You need to provide the following:

- a Macintosh Plus computer (or later model Macintosh) with at least 2 MB of RAM and a SCSI hard disk—your computer must have at least one floppy disk drive, keyboard, mouse and power cable
- a complete set of *Macintosh System 7 Software Disks*
- a *Before you Install System 7* disk
- HyperCard 1.2.2 (or later version)

If you have the *Macintosh Reference*, the *How to Install System 7* guide, and the *System 7: Compatibility With Selected Hardware and Software* pamphlet, you might want to refer to them throughout the hands-on activities in this module.

How This Module Is Organized

Part 1: Installation describes the steps necessary to successfully install System 7 from disks.

Part 2: The Desktop introduces you to many of the new features of System 7 that are found in the Finder. It also points out the differences between running System 7 and running Multifinder under System 6.

Part 3: The System Folder illustrates the changes that have been made to the Macintosh System Folder. This section highlights ways to customize any system folder to obtain the maximum benefits of using System 7.

Part 4: Memory Expansion explores and explains the options for expanding the memory capacity of any Macintosh through the use of disk cache, virtual memory and 32-bit addressing.

Part 5: Additional References provides information on Publish and Subscribe, which allows for the automatic updating of shared documents, and File Sharing, which enables any System 7 user to turn a Macintosh into a file server. A note about Extensions is also included in this section.

How to Use this Module

Go through the sections in the order presented. Afterward, go over the Skills Checklist and review any sections that you are uncertain about.

What Is the Skills Checklist?

This is a list of tasks that you should be able to perform at the conclusion of this module. The Prerequisite Exam (written and hands-on) will cover these items. During the lab part of the course, you will be expected to perform all of these tasks.

How to Use the Skills Checklist

Before starting the module, you should check the items on this list to see which tasks you can already perform. If you are confident that you can already perform certain tasks, you may decide to skip those parts of the module. Or you may decide to try the Module Test without going through the module.

After completing the module, you should read over the skills checklist to make certain that you have mastered all of the skills before you attend the Prerequisite Exam and the lab portion of this course. If you feel uncertain about any of these tasks, return to the section indicated, review the information, and repeat the hands-on exercises.

Skills Checklist

Task	Where the Task Is Covered
__ 1. Install System 7 using the System 7 software disks.	Installation
__ 2. Access and identify Balloon Help.	The Desktop
__ 3. Identify the key functions of the Application menu.	The Desktop
__ 4. Edit the name of an icon.	The Desktop
__ 5. View the contents of a window as an outline to display a listing of several levels of a file at once.	The Desktop
__ 6. Use the Find command.	The Desktop
__ 7. Create a pointer to a file by using an alias.	The Desktop
__ 8. Use the Trash Can to remove files from your floppy disk or hard disk.	The Desktop
__ 9. Install and remove programs from the Apple Menu.	The System Folder
__ 10. Describe procedures to access Control Panel files.	The System Folder
__ 11. Install and remove startup programs.	The System Folder
__ 12. Describe the purpose of the Extensions folder.	The System Folder
__ 13. Describe the purpose of the Preferences folder.	The System Folder
__ 14. Install and remove fonts and sounds.	The System Folder
__ 15. Describe virtual memory, and how it is used.	Memory Expansion
__ 16. Set up the system for virtual memory use and examine the files associated with it.	Memory Expansion

The Skills Checklist continues on the following page.

Task	Where the Task Is Covered
__ 17. Describe what 32-bit addressing and disk cache are and how these features are used.	Memory Expansion
__ 18. Define and describe File Sharing as implemented in System 7.	Additional References
__ 19. Define and describe Publish and Subscribe as implemented in System 7.	Additional References
__ 20. List possible solutions for System INIT (Extensions) conflicts.	Additional References

Continue with the next section, Installation.

Installation

Installation of System 7 is very similar to the installation of System 6.

Install or update system software using floppy disks that contain the system software. If your computer is connected to a network, you can update your system software via the network.

To install or update system software from floppy disks, you need:

- The *Install* disks (there are three 800K disks, or two 1.4 MB disks)
- The *Printing* disk
- The *Fonts* disk
- The *Tidbits* disk(s) (there are two 800K disks, or one 1.4 MB disks)
- The *Disk Tools* disk
- The *Before you Install System 7* disk
- A Macintosh computer with a hard disk drive, a floppy disk drive, and at least 2 MB of RAM

Before you Install System 7

To ensure a smooth upgrade to the new system software, it's important that you have the disk labeled *Before You Install System 7*.
The disk
- introduces the new features of system software
- checks the software already on your hard disk for compatibility with System 7
- automatically removes from your System Folder any items that may not be compatible with System 7

With your computer turned on, follow these steps:

1. Insert *Before You Install System 7* into a floppy disk drive.

2. Open the disk icon.

3. Double-click on the stack named Before You Install System 7 to open it.

4. On the contents card of the Before You Install stack, click the option titled "What's New in System 7."

A list of topics appears. Click any topic to see information about it.

5. When you're finished browsing through the new features, click Topics to go back to the Topics card.

6. From the Topics Card, click on the Contents button.

Check your Hard Disk for Compatibility

It is possible that some of the programs on your computer's hard disk may not be compatible with the new system software. Check to make sure all your applications and INIT software are compatible.

1. On the contents card, click Compatibility Checker.

2. If you see a dialog box with a button labeled Copy, click the Copy button.

The introduction screen for the Compatibility Checker appears.

Note: If you see a button labeled Set Up, click the Set Up button, then choose which disks you want to check.

3. Click Start Checking.

The Compatibility Checker begins to scan your system. Messages report the progress of the scan.

If Necessary: Move Incompatible Items Out of the System Folder

If the Compatibility Checker finds incompatible our unknown items in the System Folder of your startup disk, you'll see the message "Attention: Potential Problems With System Folder Items." (If you don't see this message, skip to the instructions for Making a Backup copy of your hard disk.)

1. To move potentially incompatible items out of your System Folder, click Move Items.

The Compatibility Checker creates a new folder on the desktop named "May not Work With System 7" and automatically moves all potentially incompatible items from the System Folder into the "May Not Work With System 7" folder.

2. If you wish to print the compatibility report, click Print Report.

3. Click Quit. Then click OK to the dialog box that appears.

4. Eject the *Before You Install System 7* disk by dragging it into the Trash Can.

Making a Backup Copy of Your Hard Disk

It's a good idea to back up your hard disk before you install System 7. You should back up important information on a regular basis, and particularly before you install new system software.

You can back up the work and programs you store on a hard disk by copying individual files to another disk.

You can also use a commercial backup program to copy some or all of your files from a hard disk to another hard disk, to a tape drive, or to floppy disks.

Use the Installer

When using the Installer, you can choose Easy Install or Customize. Easy Install process is suitable for most Macintosh users. However, in some cases, you may want to use the Customize option which allows you to select the exact combination of system files, drivers, and other resources you want. You can use this process for initial installation, for updating to a new version of system software, for installing a single special resource, or for saving space on your startup disk by eliminating software that isn't essential.

1. Choose Shut Down from the Special Menu.

2. Put the "Install 1" disk into the internal disk drive and restart your computer.

The Installer's Welcome dialog box appears.

3. Click OK in the Welcome dialog box.

You have a choice of Easy Install or Customize. If you choose Easy Install, the Easy Install dialog box appears.

4. Make sure that the hard disk indicated in the Easy Install dialog box is the one on which you want to install system software.

5. Click Install.

The Installer program begins to install the standard system software for your Macintosh.

6. When the "Install 1" disk is ejected, you see a message to insert a different disk. Insert the specified disk. (You may be asked to switch disks more than once.)

If you need to cancel the installation, click Stop.

7. When you see a message reporting that the installation was successful, click "Restart".

The Installer window closes and the computer restarts. (If for some reason the installation wasn't successful, you'll see a different message, and you can begin the installation again.)

You are now ready to use your System 7 Macintosh.

Continue With the Next Section, The Desktop

The Desktop

Overview

There are a number of differences between the Macintosh desktop with System 6, and the Macintosh desktop with System 7. This section will point most of the new features that a servicing technician needs to be aware of.

Setting up for This Section

Before completing this desktop section you must have successfully installed System 7 software on the hard disk of your Macintosh.

It is strongly suggested that you do the following:

- Make sure the System Folder on your hard disk is visible, so that you may open it
- Locate at least two System 7 compatible Macintosh application programs on your hard disk

For the examples in this exercise, a word processing program and a graphics program is used. You may use any of your own available programs that are compatible with System 7.

View the contents of your hard disk in outline format

1. If the hard disk window is not open, double click on your hard disk icon to create an active window which displays the contents of the hard disk.

Note: In the screen shots for this exercise the Name of the hard disk is "System 7 Training."

System 7 Training

2. Choose by Name from the View menu.

Here, you will notice triangles on the left side of each folder. The triangles pointing to the right indicate that the folder is closed; its contents are not displayed.

▷ ☐ Publishing Folder
▷ ☐ System Folder
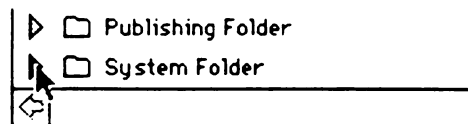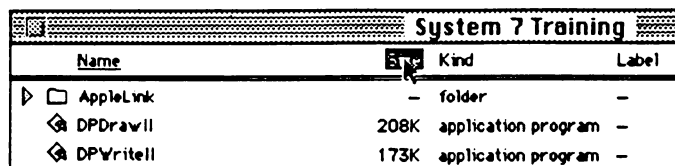
3. Click the triangle to the left of the System Folder. The triangle rotates to a downward position. At this point, contents become visible in outline format.

Sort the List View by Different Categories

1. Click the word Size in the title bar of the window.
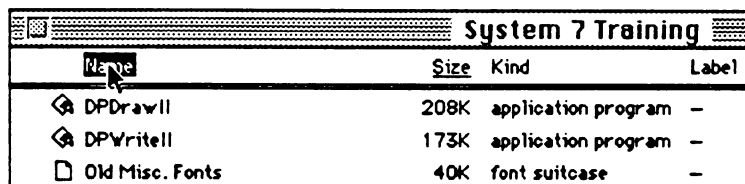
The word Size becomes underlined and files are sorted by size. Each level is sorted so that the files remain attached to their proper folders.

Name		Kind	Label
▷ ☐ AppleLink	—	folder	—
DPDraw II	208K	application program	—
DPWrite II	173K	application program	—

2. Click the word Name in the title bar of the window.

The word Name becomes underlined and files are sorted alphabetically.

Name	Size	Kind	Label
DPDraw II	208K	application program	—
DPWrite II	173K	application program	—
☐ Old Misc. Fonts	40K	font suitcase	—

3. Choose by Icon from the View menu to return to the original view.

Changing the Name of a File

1. Create a new folder on your hard disk by choosing New Folder from the File menu.

Notice that the name of the new folder is highlighted and you may type in a new name.

2. Type *My Folder* to name the folder.

3. Click on anywhere on another folder to deselect *My Folder*.

4. Click on *My Folder* to select it and press Return on your keyboard.

Notice that there is now a box around the title of *My Folder*. The name can now be changed.

3. Type in the name *Test*.

5. Click on anywhere on another folder to deselect the icon.

6. Change the folder icon's name back to *My Folder*.

Selecting a Range of Files and Labeling Them

1. Open your hard disk window, and make the window small enough so that scroll bars appear.
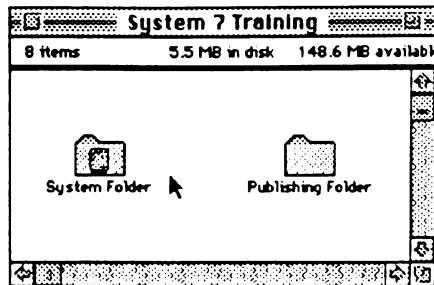
2. Click on the empty space in the upper left corner of the window and drag the mouse over the objects towards the bottom right corner. Continue to drag and notice that the window will automatically scroll. See the graphic below.
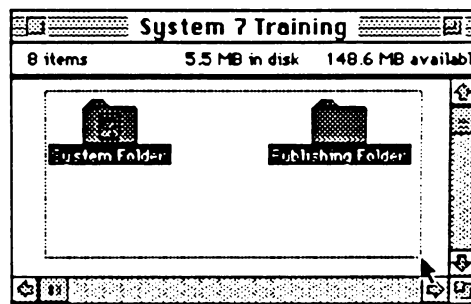
3. Click on any icon. Use the arrow keys on your keyboard to select the icon to the right, left, or above and below. The window will scroll to display hidden icons.

4. Click the upper right box of your hard disk's window. The window will either expand or contract to display all of its contents.

5. Choose by Name from the View menu.

6. Click a few triangles to expand the folder's view.
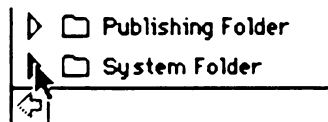
7. While holding the Shift key down, click several files and/or folders from various folders.

8. Choose any label name from the Label menu.

```
┌─────────────────┐
│ Label           │
├─────────────────┤
│ ✓None           │
│                 │
│ ▓▓ Essential    │
│ ▓ Hot           │
│ ▓ In Progress   │
│ ▓ Cool          │
│ ▓ Personal      │
│ ▓ Project 1     │
│ ▓ Project 2     │
└─────────────────┘
```
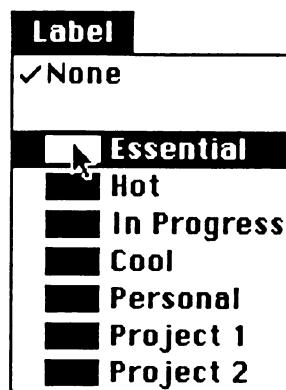
All selected icons will be given that label name. You may need to expand the window so that the Label heading is visible.

9. Click the Label heading of your hard disk's window. Files are now arranged by label.

```
┌──────────────────────────────┐
│ ▓▓ System 7 Training ▓▓       │
├──────────────────────────────┤
│ Size   Kind          Label    │
│──────────────────────────────│
│  —     folder          —      │
```
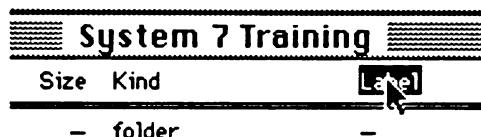
10. Remove the assigned label by selecting the files again and choosing None from the Label menu.

Opening Multiple Applications and Moving Between Them

1. Locate and double-click any System 7 compatible application to open it.

Note: In the screen shots for this exercise the names of the applications are "DPWrite II" and "TeachText." You may use any available System 7 compatible applications.

2. Click and hold the mouse button down on the Application menu icon at the upper right of the menu bar. The active application has a check to its left. Choose Finder.

```
                ┌──────────────┐
                │ Hide DPWriteII│
                │ Hide Others   │
                │ Show All      │
                │──────────────│
                │ ✓ DPWriteII   │
                │ ▓ Finder      │
                └──────────────┘
```

System 6 vs System 7

The hard disk window will become active. You are currently running an application, yet you still have access to the desktop. This was known as MultiFinder in System 6. Be aware that you are "always in MultiFinder" while running System 7. There is no way to turn this feature off as there was in System 6. In System 6, open applications were listed under the ● menu. In System 7, open applications are listed under the Application menu.

1. Locate and double click on any document on your hard disk that was created by a different application.

If you get an error message saying there is not enough memory to open that application, then just finish this exercise with only one application and the Finder running.

2. Click and hold the mouse button down on the Application menu icon at the upper right of the menu bar. Notice that any applications that are currently running (including Finder) are listed with a check next to, the active application.

3. Choose Hide <your second application's name> from the Application menu.

```
                    ┌────────────────┐
                    │   ⁇  ⬙          │
                    ├────────────────┤
                    │ Hide TeachText │
                    │ Hide Others    │
                    │ Show All       │
                    ├────────────────┤
                    │ ⬙ DPWrite II   │
                    │ ⬙ Finder       │
                    │ ✓⬙ TeachText   │
                    └────────────────┘
```
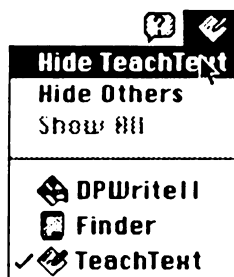
Note that the open document is no longer visible, yet it is still loaded in RAM.

4. Choose Finder from the Application menu icon (in the upper-right corner of the menu bar). Notice that the menubar menus have changed back to the Finder menus.

5. Choose Hide Others from the Application menu icon.

```
                    ┌────────────────┐
                    │   ⁇  ⬙          │
                    ├────────────────┤
                    │ Hide Finder    │
                    │ Hide Others    │
                    │ Show All       │
                    ├────────────────┤
                    │ ⬙ DPWrite II   │
                    │ ✓⬙ Finder      │
                    │ ⬙ TeachText    │
                    └────────────────┘
```
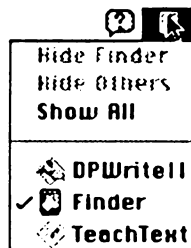
6. Click on the Application menu icon. Notice that the icons of the hidden applications are dimmed.

7. Choose Show All from the Application menu icon, the open documents reappear on the desktop. Click and hold down the mouse on the Application menu and notice the icons are darkened again.

```
                  ⑫ ▣
        ┌─────────────────┐
        │ Hide Finder     │
        │ Hide Others     │
        ├─────────────────┤
        │ Show All        │
        │       ▶         │
        ├─────────────────┤
        │ ⬥ DPWriteII     │
        │ ✓▣ Finder       │
        │ ⬥ TeachText     │
        └─────────────────┘
```

8. Choose <your first application's name> from the Application menu icon.

9. Choose Quit from the File menu.

Saving your document to the desktop.

1. Choose <your second application's name> from the Application menu icon.

2. Make any change to the document.

3. Choose Save As...from the File menu.

```
        ┌───────────────────┐
        │ ⊂ System 7 Tr...  │
        │  ┌──┐ ┌─────────┐ │
        │  │⇧ │ │  Eject  │ │
        │  ├──┤ └─────────┘ │
        │  │  │ ┌─────────┐ │
        │  │  │ │ Desktop │ │
        │  │  │ └─────────┘ │
        │  │  │ ┌─────────┐ │
        │  │⇩ │ │ New  ▢  │ │
        │  └──┘ └─────────┘ │
        └───────────────────┘
```
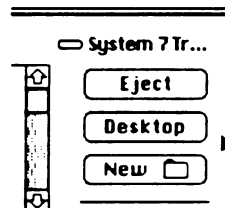
The Save and Save As.. dialog boxes now feature a button called Desktop. Use it to save a document at the desktop level or select a different disk.

System 6 vs System 7

The Desktop button in System 7 replaces the Drive button in System 6.

4. Name the file as <your first name. >

5. Click on the Desktop button. The document is now ready to be saved onto the desktop level of the hard disk.

6. Click on the Save button to save the document to the hard disk.

7. Choose Quit from the File menu.

8. Close all open windows. You should now see your document on the desktop.

9. Find your file and drag it into the trash can.

Exploring Balloon Help

1. Choose Show Balloons from the **?** (Help) menu at the top right of your menu bar.

```
                                    [?]
        ┌──────────────────────────────┐
        │ About Balloon Help...        │
        │ .............................│
        │ Show Balloons      ▶         │
        ├──────────────────────────────┤
        │ Finder Shortcuts             │
        └──────────────────────────────┘
```
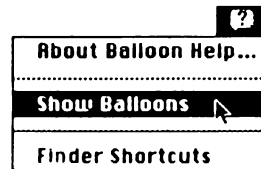
2. Point to several different items to read the corresponding Help balloon.

3. Choose Hide Balloons from the **?** (Help) menu to deactivate the Help balloons.

4. Close all open windows except the Hard Drive window.

5. Choose by Icon from the View menu.

Creating and Using an Alias file

An alias is a representative of, or a pointer to the original folder, document, or application that you can use as if it were the original. For example, if you have a file stored in a folder, you can put an alias on the desktop, where you can use it without opening any folders. When you open the alias, the original folder, document, or application opens.

1. Quit all open applications by selecting the application from the Applications Menu, and choosing Quit from the File menu.

2. Locate any application or document that is buried inside many folders.

3. Single-click the program or document icon to select it.

4. Choose Make Alias from the File menu. The file is named "<the name of your document> alias".

```
        ┌──────┬─────────────┐
        │ File │ Edit  View  │
        ├──────┴─────────────┤
        │ New Folder      ⌘N │
        │ Open            ⌘O │
        │ Print           ⌘P │
        │ Close Window    ⌘W │
        ├────────────────────┤
        │ Get Info        ⌘I │
        │ Sharing...         │
        │ Duplicate       ⌘D │
        │ Make Alias         │
        │ Put Away        ⌘Y │
        └────────────────────┘
```
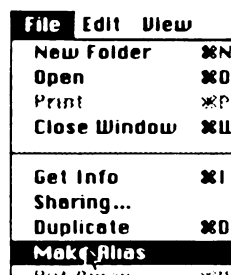
5. Type the name *My Alias* to rename the file. Notice the name remains in italics.

6. Move the *My Alias* icon to the desktop and close the folder that contains the original.

7. Double-click the *My Alias* icon. Notice that the application launches as if you had double-clicked the original.

8. Choose Quit from the File menu. You will return to the Finder.

The alias is not a copy of the original file. It's like a signpost that tells the computer how to find the original. It has the same icon as the original, but its name appears in italics. You can make any number of aliases from an original file. An alias is a tiny file (about 1 kilobyte in size), and does not require much disk space.

Putting an Alias in the Apple Menu Folder

You can get easy access to any program, file, or folder by adding an alias of it to the Apple (⌘) menu. Then you can choose the item's name from the Apple menu whenever you want to use it.

1. Open the System Folder on your startup disk by double-clicking it. Scroll so that the Apple Menu Items folder is visible.

2. Drag the icon of *My Alias* into the Apple Menu Items folder inside the System Folder (as shown in the picture below).
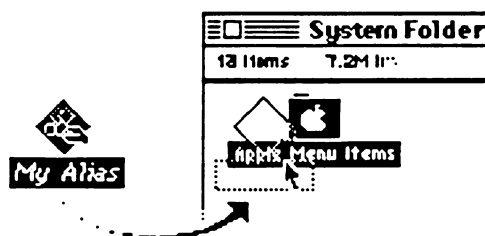
3. Click and hold down the mouse button on the ⌘ menu. Notice that *My Alias* has been added to the menu.

4. Choose *My Alias* from the ⌘ menu. Notice that the application launches as if you had double-clicked the original.

5. Choose Quit from the file menu.

Apple strongly recommends that you do not put applications in the Apple Menu Items folder. Instead, you should put Aliases of applications or documents in the Apple Menu Items folder. The Apple Menu Items folder will be further explained in the next section, The System Folder.

Using the New Trash Can

1. Open the Apple Menu Items folder which is located inside the System Folder.

2. Discard the *My Alias* file by dragging it into the trash.

Trash

3. Single-click on the trash to select it then, choose Get Info from the File menu.

4. Make sure that the check box next to Warn Before Emptying is selected.

5. Close the Get Info window.

6. Choose Empty Trash from the Special menu

You will receive a warning telling you how many items are about to be emptied, and how much disk space you will regain.

7. Click on the OK button to empty the trash.

System 6 vs System 7

In System 6, the Trash empties when
- you eject a diskette
- launch any application
- the Macintosh requires more floppy or hard disk space
- you choose Empty Trash from the Special menu
- you choose Restart or Shut Down from the Special menu

In System 7, the Trash empties only when
- you choose Empty Trash from the Special menu

Customize your Window View

1. Your hard disk's window should be open.

2. Choose by Name from the View menu.

3. Choose Control Panels from the ⬛ Menu. If necessary, scroll to make the Views icon visible in the control panel window.

4. Double click on the Views control panel to open it. DO NOT explore the other Control Panels at this time. Control Panels and other aspects of the System Folder will be explained in the next section, The System Folder.

5. Use the pop-up menu to change the name of the font from Geneva to Helvetica. Change the font size also. Note the immediate change in the window.
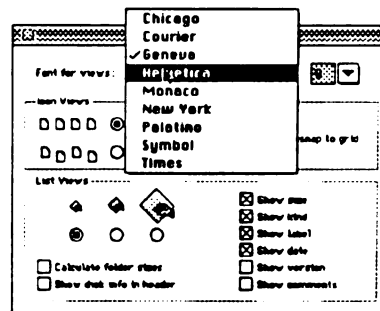
6. Change the font back to Geneva, 9 pt.

7. Click the radio button below the largest icon view size. Note the immediate change in the size of the icons in the listing of files.
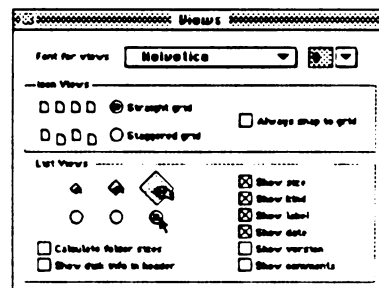
8. Click the radio button below the smallest icon view size to undo the changes.

9. Click the box Calculate Folder Sizes. You may need to move the Views window to see the effect on the hard disk windows.

Note: The folders now have an entry in the Size column. Also note that window updating is slower with Calculate folders turned on (this will be especially true when you have file servers mounted.)

10. Click the box Calculate Folder Sizes again to deselect this option.

11. Close the Views control panel window.

12. Close the Control Panels window.

Change the Appearance of a Window's Icons

1. Close all windows on your screen.

2. Choose Control Panels from the menu.

3. Choose by Icon from the View menu.

4. Double-Click on the Views icon in the Control Panel folder to open it.

5. Change the Icon Views to Staggered Grid.
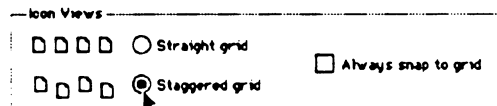
6. Close the Views window.

7. Choose Clean Up Window from the Special menu to see the changes.

8. Change the Icon Views back to Straight Grid.

9. Choose Clean Up Window from the Special menu to undo the changes.

10. Close the Control Panels window.

The Find Command

You can locate a file by its name (whether you know the whole name or just part of it), and by a number of other characteristics.

In order to use the Find command you must be in the finder. To locate a file by its name only:

1. Choose Finder from the Application menu (in the upper-right corner of the menu bar).

Hide HyperCard
Hide Others
Show All

Finder
✓ HyperCard

2. Choose Find from the File menu

The Find dialog box appears, with a blinking insertion point.

Find
Find: |
More Choices   Cancel   Find
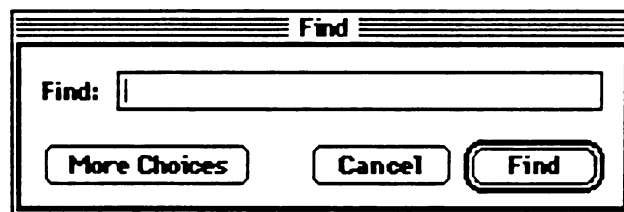
3. Type the text you want to find. (You can use either uppercase or lowercase letters.)

Find
Find: budget
More Choices   Cancel
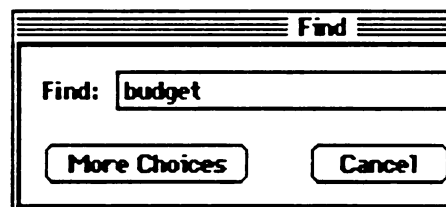
4. Click the Find button.

The first item found is displayed. If you want to keep searching, choose Find Again from the File menu to display the next item found. An alert sounds when no more items can be found on the selected folume(s).

Locate a file by any characteristic

You can also locate a file by any characteristic such as the date it was modified. For example, let's say you wanted to find all the documents that were modified before today.

1. Choose Find from the File menu

2. Click More Choices to display the expanded Find dialog box.

3. Select the characteristic (date modified) by choosing it from the pop-up menu on the left.
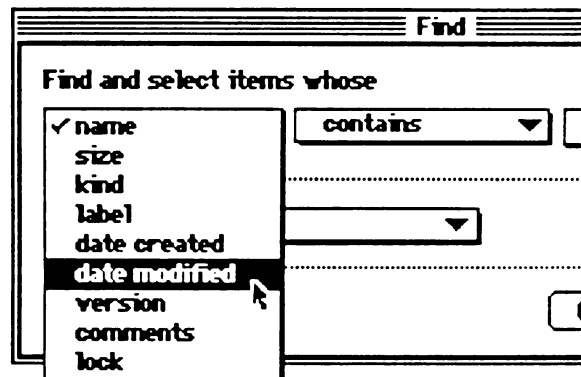
4. Select a value for the characteristic (is before) by choosing it from the middle pop-up menu.
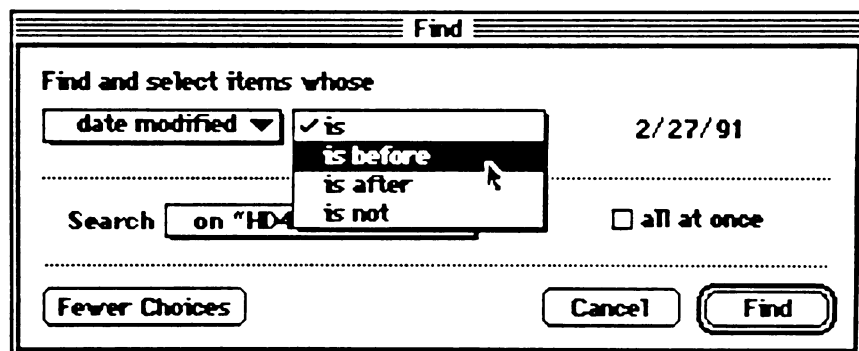
5. Enter today's date to search for in the upper-right area of the dialog box.

6. If necessary, choose the disk you want to search from the lower pop-up menu, or choose "the selected items" to search within the active window.

7. Click to remove the X from the "all at once" checkbox, if you want the items found to be highlighted one at a time. Otherwise, leave it selected to have all the items found highlighted at once.

8. When you've finished selecting the search characteristics, click the Find button.

If you hear the alert sound, it means that no items were found.

If you've chosen to have the search results displayed one at a time (instead of all at once), the first item found is highlighted and displayed on the screen. To display each successive item, choose the Find Again command from the File menu.

Only the search results for one disk, a window, or a selection can be displayed all at once. These results appear in a list view, arranged by name.

Other useful examples of the Find command would be:

- Search on Name Contains System and select the all at once box. This would display all files or folders whose name contains system.

- Search on date created is <today's date> to find a document you created today.

Continue with the Next Section, The System Folder.

The System Folder

Overview

The System Folder contains various files that allow you to adjust the system to the way you want to work, making it easier to understand and use.

There are five folders within the System Folder:

- Apple Menu Items
- Control Panels
- Extensions
- Preferences
- Startup Items

The system software can assist you by automatically installing system configuration and control files into the appropriate folder. This is helpful when you're not sure in which folder a file should be installed.

By simply dragging a file icon onto the System Folder icon, the Finder will figure out where the file should be installed and, after asking you for a confirmation, install it there.

Setting up for This Section

Before completing this System Folder section you must have successfully installed System 7 software on the hard disk of your Macintosh.

It is strongly suggested that you do the following:

- Make sure the System Folder on your hard disk is visible, so that you may open it.

The Apple Menu Items Folder

In System 7 you can have instant access to applications, documents, or folders by selecting their aliases from the Apple menu. You also have instant access to control panels, stationery pads, aliases, folders, Desk Accessories (DAs), and documents. This means that any frequently used application or document can be immediately accessible without having to return to the desktop or open various folders.

To allow instant access to an item, simply put it in the Apple Menu Items folder within the System Folder. Items added to the Apple Menu Items folder are instantly available; you don't have to restart the system for the changes to take effect.

To remove items from the Apple menu, simply drag their icons out of the Apple Menu Items folder. Remember that the Apple Menu Items folder resides inside the System Folder.

System 6 vs System 7

In System 6, the way to get a Desk Accessory (DA) into the Apple Menu was to use Font/DA mover. In System 7, the way to get items (such as DA's, applications, documents, or aliases) into the Apple Menu is to simply drag them into the Apple Menu Items folder. DAs will automatically be installed into the Apple Menu Items folder if dragged on the System Folder icon.

Modify What Is Displayed In the Apple Menu

1. Double-click on your hard disk's icon to open it.

2. Double-click on the System Folder to open it.

3. Double-click on the Apple Menu Items folder to open it.
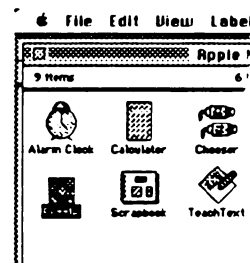
4. Click and hold down the mouse button on the ☀ menu. Note that the contents of the ☀ menu are identical to the contents of the Apple Menu Items folder.
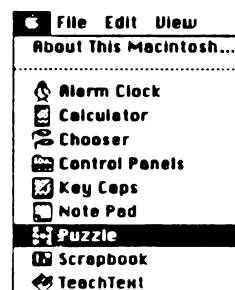
5. Choose Puzzle from the ☀ menu.

6. Close the Puzzle.

7. Drag the Puzzle icon from the Apple Menu Items folder and place it on the desktop.
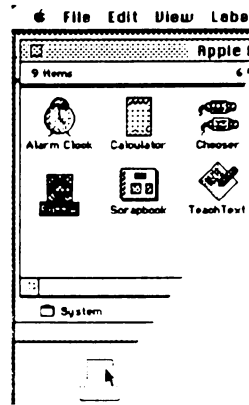
8. Click and hold down the mouse button on the menu. Note that the Puzzle is now missing from the menu.

9. Drag the Puzzle icon back into the Apple Menu Items folder.

10. Click and hold down the mouse button on the menu. The Puzzle has returned!

The Control Panels Folder

In System 7.0 you determine the configuration of your system by using control panels. All control panels open as though they were applications. Just double-click their icons, and you have access to the control you want.

Installing control panels simply involves dragging their icons onto the System Folder icon, which places them in the Control Panels folder. You can move control panels to the Control Panels folder yourself, of course.

There is an alias for the Control Panels folder in the Apple menu, so that the control panels are easily accessible at any time.

To Access the Control Panels Folder

1. Choose Control Panels From the Apple Menu

This is actually an alias to the Control Panels Folder which resides in the Apple Menu Items Folder.

2. Double-click on any of the Control Panel icons to access them.

3. Close the Control Panel window, and the Control Panels folder.

The Extensions Folder

System 7 includes files that extend the functionality of the system. These are placed in the separate Extensions folder.

These files include:

- INITs,(now called Extensions in System 7) such as screen savers

- Chooser files, such as LaserWriter, ImageWriter, and AppleShare® (accessed from the Chooser)

- Device drivers, such as that for a CD-ROM drive (not accessed directly)

There is no "law," however, that requires these to be in the Extensions folder. You can place them in the System Folder proper, if you prefer.

- If drivers or INITs don't work when placed in the Extensions folder, place them in the System Folder.

- Device drivers (rdevs), Chooser files, and INITs are automatically installed in this folder.

The Preferences Folder

In an effort to keep the System Folder from getting too cluttered, the Preferences folder was created to hold the various preferences stored by applications and system programs.

Preference files are usually separate files that an application uses, but are not part of the application itself. A word processor's preference file might include the default font used for newly entered text as well as other parameters. Dictionaries are another example of a word processor's preference file. A drawing program's preference file might specify that initially distances should be measured in centimeters. This folder also includes various preferences of the Finder, file sharing, and the Edition Manager.

Generally, applications will place preference files in a pre-defined place, which may be either the Preferences folder or the System Folder.

If an application creates its own Preferences folder, the application may become confused if its own Preferences folder is moved, so you may need to leave it where it was created

The Startup Items Folder

In this folder, place the icons of the items you want opened when the system switches on. As with the Apple menu, these items can be programs, DAs, documents, aliases, applications, and so on. Some examples of Startup Items folder use might be:

- Place a budget or status report document (or an Alias to that document) that you are currently working on in the Startup Items folder so that it opens automatically when you turn on your machine.

- Place aliases of the applications you are sure to use in the Startup Items folder so they are open and ready when you turn on your machine.

Make Anything Startup When you Turn on your Macintosh.

1. Open the System Folder.

2. Drag the Alarm Clock icon from the Apple Menu Items folder to the Startup Items folder.
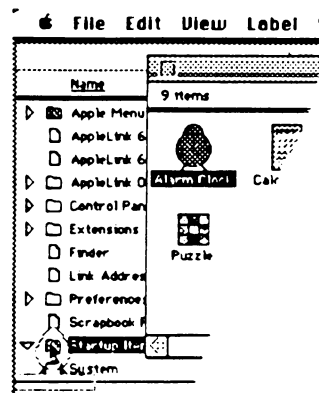
3. Choose Restart from the Special menu. Note that the alarm clock automatically opens upon startup.
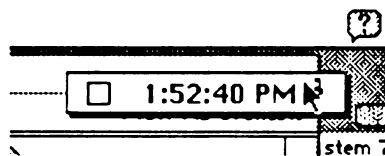
4. Close the Alarm Clock

5. Return the Alarm Clock icon from the Startup Items folder to the Apple Menu Items folder.

Fonts

Bit mapped fonts are in common use on Macintosh computers. A bit mapped (fixed-size) font contains a full set of characters in one size, for example 10-point Geneva. You can use these fonts in any size, but the display on the screen, and on the output of non-PostScript® printers, is an approximation between the size you requested and the font size available in the system. Sizes other than those specifically in the System file appear jagged.

System 7 has a new way of drawing fonts on the screen to avoid the need for approximating the size, utilizing a technology called TrueType.

TrueType fonts contain a set of coordinates that describe all the characters of one font. System software uses the coordinates to calculate and display (or print) characters in any size desired. All font sizes appear smooth; there are no more problems with "the jaggies" from not having the right-sized font. Just one TrueType font gives you optimal readability, for that font, on the screen, and on a variety of output devices.

You can use both fixed-size and TrueType fonts with System 7 on any Macintosh computer. In fact, when your system software is first installed, a core set of both types of fonts is present.

TrueType saves a significant amount of disk space. For example, installing the normal 9, 10, 12, 14, 18, and 24-point sizes of Helvetica® takes 72K of disk space. Installing the TrueType font, which handles all these sizes and more, takes only 58K (nearly a 20 percent savings). Bold, italic, and bold italic TrueType fonts are available as well.

Remove and Add Fonts to the System file

1. Open the System Folder. Locate the System icon. Notice it now appears as a suitcase file. This indicates it can be open directly.
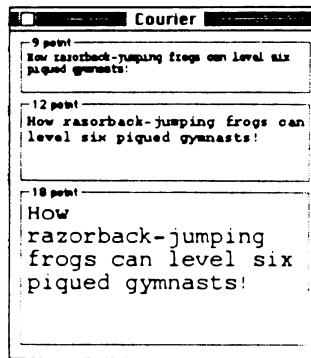
2. Double-click (open) the System icon.

System
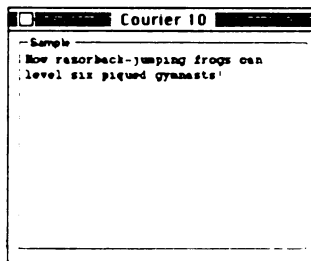
3. Choose by Icon from the View menu.

Notice that there are two different icons for fonts. The icons with 3 "A's" are the TrueType fonts. The icons with only one "A" are bit-mapped fonts. Each bit-mapped font icon represents a different point size.
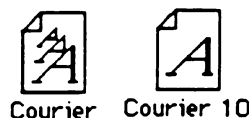
Courier   Courier 10

4. Choose by Name from the View menu.

5. Double-Click on the Courier font. Note that the font is displayed in 3 different sizes, distinguishing it as a TrueType font.

```
┌─────────■ Courier ■─────────┐
│ ┌─9 point ──────────────────┐ │
│ │ How razorback-jumping frogs can level six │ │
│ │ piqued gymnasts: │ │
│ │                          │ │
│ ┌─12 point ─────────────────┐ │
│ │ How razorback-jumping frogs can │ │
│ │ level six piqued gymnasts! │ │
│ │                          │ │
│ ┌─18 point ─────────────────┐ │
│ │ How                      │ │
│ │ razorback-jumping        │ │
│ │ frogs can level six      │ │
│ │ piqued gymnasts!         │ │
│ └──────────────────────────┘ │
└──────────────────────────────┘
```

5. Close the Courier font window.

6. Double-Click on the Courier 10 font. Note that the font is displayed in only one size, distinguishing it as a Bit-Mapped font.

```
┌─────────■ Courier 10 ■─────────┐
│ ┌─Sample ────────────────────┐ │
│ │ How razorback-jumping frogs can │ │
│ │ level six piqued gymnasts' │ │
│ │                            │ │
│ │                            │ │
│ │                            │ │
│ │                            │ │
│ └────────────────────────────┘ │
└────────────────────────────────┘
```

5. Close the Courier 10 font window.

6. Drag the Times font icon onto the desktop.

Times

This is all that is necessary to remove fonts from your system.

7. Re-install the Times font by dragging its icon back into the System icon.

8. Close all but the System Folder window.

Remove and Add Sounds to the System File

1. Choose Control Panels from the menu.

2. Double-click on the Sound icon.

Sound

3. Click on any of the installed sounds to hear them. Adjust the speaker volume control if you can not hear the sounds.
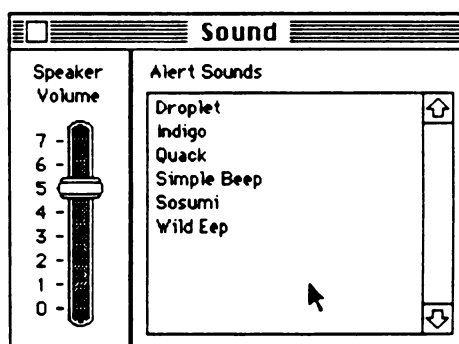
4. Double-click on the System icon in the System Folder.

5. Drag the "Quack" sound out of the System file and onto the desktop.

Quack

6. Notice that the sound has been deleted from the Sound control panel.

7. Drag the sound from the desktop into the System file to reinstall it.

8. Notice that the sound has returned to the Sound control panel.

Continue with the next Section, Memory Expansion.

Memory Expansion

Overview

In order to take full advantage of your system's capabilities, you may want to become familiar with both the amount of memory your Macintosh has, and the memory requirements of each of the applications you use.

Your system must have at least 2 megabytes of RAM to use version 7.0 of the Macintosh system software.

This amount of memory (2 MB) usually allows you to open one application and one or more desk accessories, or two applications that do not require large amounts of memory.

A system often falls short on memory when you work with large applications, or documents, or have several applications open at once.

If the systems with on-board video have only 2 MB of RAM, there are three options to enable them to run multiple applications under System 7:
- Install more RAM
- Install a video card or run in black-and-white mode
- Run Virtual Memory

Setting up for This Section

Before completing this System Folder section you must have successfully installed System 7 software on the hard disk of your Macintosh.

For this exercise, if possible, use a system with a 68030 CPU.

Disk Cache

Disk cache is memory set aside to help the Macintosh work more quickly and efficiently.

When a program asks for data from the disk (such as a part of a document), many times the next piece of data the program will need (such as the next part of the document) can be anticipated.

Therefore, instead of transferring from disk to memory only the amount of data you are immediately working with, the system will put a larger amount (the size-of-disk-cache) of data into memory. This way, instead of spending the time to search for data on the disk again, the next piece of information will already be available.

It may seem that you should configure the size of disk-cache to be very large to reduce the need to search on the disk. The reason not to do this is that the memory allocated to disk cache cannot be used for opening more applications or documents. It becomes dedicated to caching.

If you want to open more applications than current available memory allows, try setting the disk cache to a smaller size.

Mostly you will find you can let this feature work for you, and you don't need to configure it.

System 6 vs System 7

In System 7, disk caching is always turned on. Adjustments for the size of the disk cache configured are made in the Memory control panel. In System 6, RAM Cache is turned on and off by the user and controlled in the General CDEV.

32-Bit Addressing

Some Macintosh computers can greatly expand the number of megabytes of RAM memory available to them by implementing 32-bit addressing. The computers that can use 32-bit addressing are the Macintosh LC, IIsi, IIci, IIfx, Macintosh Quadra 700, Macintosh Quadra 900, Macintosh PowerBook 140, or Macintosh PowerBook 170. The limit for virtual memory on a 32-bit machine is 1 Gigabyte.

You can check if your computer can implement this feature through the Memory control panel. If there is a section of this control panel called 32-bit addressing, your computer is capable of this feature.

With 24-bit addressing, Macintosh computers are not capable of using more than 8 MB of RAM (except the Macintosh LC can use 10 MB). With 32-bit addressing advanced users can take advantage of as much RAM as can be installed in their system.

It is recommended that you check the software manufacturer's documentation before configuring 32-bit mode. If a program is not specifically written to be run in 32-bit mode, then you should run in 24-bit mode, which is the default.

This is a smart control device (cdev) in that only the machines capable of virtual memory will show VM options and only machines capable of 32-bit addressing (Macintosh IIfx, IIci, IIsi, LC, Quadra 700, Quadra 900, PowerBook 140, and PowerBook 170) will show 32-bit options.

The software limitation in System 6 is 8 MB of user addressable memory space (without using third-party software packages). There are 16 MB of hardware space available, but 2 MB are taken up with ROM and I/O space, and 6 MB are reserved for NuBus slots.

Checking System Memory

You can check both your system's physically installed memory and the amount of memory used by each open application. To do this, you must be in the finder.

1. Choose About this Macintosh from the menu. Note the amount of total memory.
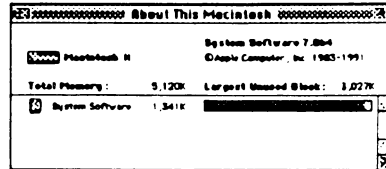
The upper part of the window tells you the amount of total memory available to the system, and the size of the largest unused block of memory, in kilobytes. The bottom part of the window tells you the amount of memory used by each open application.

Any application that you open must use less memory than the number indicated as the Largest Unused Block.

Virtual Memory

When you use hard disk space to increase your computer's memory, this disk space (called virtual memory) isn't available for storing information. The amount of disk space reserved for virtual memory can be very large.

Virtual memory isn't available on all models of the Macintosh, and it's not recommended for your everyday work. It's better to make sure your Macintosh contains enough built-in random-access memory (RAM) for the programs you use regularly. Large amounts of virtual memory are likely to slow the computer's performance. You should use virtual memory for occasional memory expansion.

Assuming that the Mac is capable of using virtual memory, there are 3 things to keep in mind.

1. Physical RAM installed: You're not to exceed the amount of physical memory with Virtual Memory. For example, if you have 4 MB of RAM, you should only use 4 Mb of Virtual Memory to have a total memory of 8 Mb. This recommendation is for performance reasons.

2. Memory Addressing (24 -bit vs. 32-bit): On 24-bit addressing you can have a total of 16 Mb of addressable memory. However, you need to deduct 2 Mb for Input/Output and ROM functions, and 1 Mb for every NuBus card installed. So if you have a Mac II with a PMMU chip and a video card, you can only have a total of 13 Mb of memory. (16 Mb, minus 2 for I/O & ROM, minus 1 Mb for the Video Card)

3   Disk Space: Since Virtual Memory will use the hard disk for storage, you need to have enough room. When you turn Virtual Memory on, it creates an invisible file of the total memory size. That includes the physical memory plus Virtual Memory. So, in the case of the Mac II mentioned above, the hard disk space required will be 13 MB.

Turn on Virtual Memory

Optional: You cannot use virtual memory on a Macintosh Plus, Macintosh Portable, Macintosh SE, Macintosh Classic, Macintosh II (without PMMU), or Macintosh PowerBook 100.

1.   Choose Control Panels from the menu.

2.   Double-click the Memory control panel icon to open it.
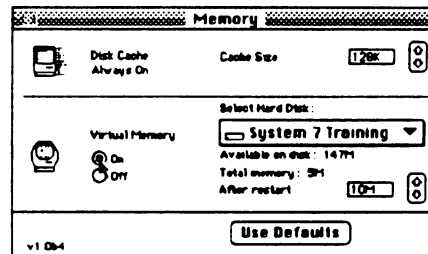
3.   Click the On button in the virtual memory section of the window to turn on virtual memory.

4.   Use the pop-up menu to select the hard disk for using virtual memory.

5.   Select the Use Defaults button to assign twice as much virtual memory as you have in physical memory (RAM).

6.   Use the up arrow top determine the maximum amount of virtual memory available.

7.   Choose Restart from the Special menu

8.   Choose About this Macintosh from the menu to see the effect of using virtual memory.

Turn on 32-bit Addressing

Optional: perform this if you are using a Macintosh LC, IIsi, IIci, IIfx, Macintosh Quadra 700, Macintosh Quadra 900, Macintosh PowerBook 140, or Macintosh PowerBook 170.

.
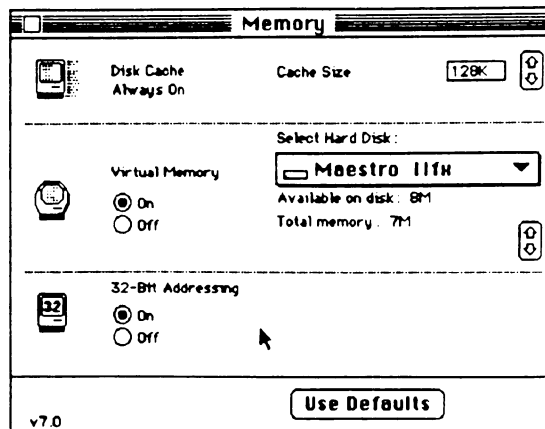
1. Click the On button in the 32-bit addressing section of the window.

2. Use the up arrow in the virtual memory section. Note the new upper limit for virtual memory.

Note: Mode 32 is a program that is distributed by Connetix that allows 32-bit addressing on Macintoshes that do not normally run in 32-bit mode.

Memory Summary

These computers cannot run virtual memory or in 32-bit mode.
- Macintosh Plus
- Macintosh Portable
- Macintosh SE
- Macintosh Classic
- Macintosh II (without PMMU)
- Macintosh PowerBook 100

These computers cannot go beyond 14MB memory with virtual memory on because they use 24-bit addressing. They cannot run in 32-bit mode.
- Macintosh Classic II
- Macintosh SE/30 (13MB VM Maximum)
- Macintosh II (with PMMU)
- Macintosh IIx
- Macintosh IIcx

These computers can run in 32-bit mode, can address upper limit of physical RAM limitation, can run with virtual memory at 1 Gigabyte of memory.
- Macintosh IIci
- Macintosh IIfx
- Macintosh IIsi
- Macintosh Quadra 700
- Macintosh Quadra 900
- Macintosh PowerBook 140
- Macintosh PowerBook 170

This computer cannot run virtual memory, but can address up to 10MB with 32-bit addressing on.
- Macintosh LC

The formula for calculating the maximum amount of total memory (including virtual memory) on a 24-Bit machine is:

      16 Mb upper limit of addressable memory
   -   2 Mb for Input/Output and ROM functions
   -   1 Mb for each NuBus card installed
   =   Maximum amount of total memory

Continue with the Next Section, Module Summary.

Module Summary

This section outlines the key points from this module.

Installation

Before installing System 7 onto any Macintosh computer, it is very important to follow these basic steps:

- Run the Compatibility Checker HyperCard stack on your hard disk. This stack is found on the disk labeled *Before you Install System 7*.
- If necessary, move any incompatible items out of the your System Folder.
- Backup your hard disk, to either floppy disks, another hard disk, tape drive, or other storage device.

The Desktop

You learned many of the new features of the System 7 desktop including:

- Viewing the contents of your hard disk in outline format and sorting the list views by different catagories
- Changing the name of a file
- Using the Label menu
- Opening multiple Applications and moving between them
  Saving your document to the desktop
- Using Balloon Help
- Creating and using an Alias to a file
- Putting items in your Apple Menu folder
- Using the new trash can
- Customizing your Views and appearance of a window's icons

The System Folder

The System Folder now contains five folders to help eliminate clutter. These folders include:

- Apple Menu Items
- Control Panels
- Extensions
- Preferences
- Startup Items

The **Apple Menu Items** folder contains items that appear in your menu. Anything can now be placed into this folder, applications, desk accessories, documents, or aliases. As soon as the item is placed in this folder, it is available through the menu.

Control Panels can now be opened by double-clicking on them. There is also an alias for the Control Panels folder in the Apple Menu, so that the control panels are easily accessible at any time. To install Control Panels, just drag them into your system folder.

The **Extensions Folder** includes files that extend the functionality of the system. These include INITs, Chooser files, and device drivers, such as that for a CD-ROM drive.

The **Preferences Folder** contains separate files that an application uses such as default settings for a drawing program, or a dictionary for a word processor. In addition, various preferences of the finder file sharing, and Edition manager are stored in the Preferences Folder.

The **Startup Items** folder enables you to specify anything to open right after you turn on the system. Anything such as an Alias, a document that you frequently work on, or an application can be stored in this folder. These items will open immediately following startup.

System 7 has a new way of drawing fonts on the screen to avoid the need for approximating the size, utilizing a technology called **TrueType**. TrueType fonts contain a set of coordinates that describe all the characters of one font. System software uses the coordinates to calculate and display (or print) characters in any size desired. All fonts sizes appear smooth.

To remove fonts or sounds from your System Folder, simply double-click on the System icon and drag the desired items out of the System window.

Memory Expansion

System 7 brings you new ways to expand the memory capacity of your Macintosh. Through the use of Disk Cache, 32 bit addressing and Virtual Memory, you can configure you system to best meet your needs.

In System 7, disk caching is always turned on. Adjustments for the size of the disk cache configured are made in the Memory control panel. In System 6, RAM Cache is turned on and off by the user and controlled in the General CDEV.

With 24-bit addressing, Macintosh computers are not capable of using more than 8 MB of RAM (except the Macintosh LC can use 10 MB). With 32-bit addressing advanced users can take advantage of as much RAM as can be installed in their system.

It is recommended that you check the software manufacturer's documentation before configuring 32-bit mode. If a program is not specifically written to be run in 32-bit mode, then you should run in 24-bit mode, which is the default.

The software limitation in System 6 is 8 MB of user addressable memory space (without using third-party software packages). There are 16 MB of hardware space available, but 2 MB are taken up with ROM and I/O space, and 6 MB are reserved for NuBus slots.

When you use hard disk space to increase your computer's memory, this disk space (called virtual memory) isn't available for storing information. The amount of disk space reserved for virtual memory can be very large.

Virtual memory isn't available on all models of the Macintosh, and it's not recommended for your everyday work. It's better to make sure your Macintosh contains enough built-in random-access memory (RAM) for the programs you use regularly. Large amounts of virtual memory are likely to slow the computer's performance. You should use virtual memory for occasional memory expansion.

Continue with the next section, Module Test.

Module Test

Choose the best answer.

1. All application programs that are compatible with system software version 6.0.x are compatible with system software version 7.

   ___True ___False

2. To update your Macintosh to System 7, drag the System and Finder icons from the installation disk to your system folder and restart the system.

   ___True ___False

3. System 7 includes built-in help accessible through the Help menu.

   ___True ___False

4. Control panels are accessed by double-clicking on the System file icon.

   ___True ___False

5. Before installing System 7, you should:

   ___A. erase your hard disk

   ___B. back up your hard disk

   ___C. remove your hard disk

   ___D. view the contents of your hard disk by date

6. Select the correct function(s) of the Application Menu.

   ___A. Identifies open programs, and their versions

   ___B. Switches between open programs and identifies their versions

   ___C. Switches between open programs only

   ___D. Displays open programs, and allows switching between them

Module Test

7. In order to view and select documents and folders from different folder levels, what category should you use to view the contents of a window?

___ A. By Icon

___ B. By Name

___ C. By Small Icon

___ D. B and C

8. What is an Alias?

___ A. A duplicate of the document, folder, or application

___ B. A Preference File in the System Folder

___ C. A file that points to (represents) a document, folder, application or volume

___ D. An AppleShare FileServer

9. Where should you store an alias in order to access it from the Apple (⌘) menu?

___ A. In the Apple Menu Items Folder

___ B. In the Startup Items Folder

___ C. Anywhere in the System Folder

___ D. Anywhere on your hard disk

10. Which characteristic would you need to search on in order to find a document that you created on a specific date?

___ A. name

___ B. size

___ C. date created

___ D. label

Module Test

11. Which situation below would cause the trash to be emptied in System 7?

    ___ A. you eject a diskette

    ___ B. the Macintosh requires more floppy or hard disk space

    ___ C. you launch any application

    ___ D. you choose Empty Trash from the Special Menu

12. Files such as INITs, LaserWriter drivers, and CD-ROM drivers are usually stored in the _____ .

    ___ A. the Extensions folder

    ___ B. the Startup Items folder

    ___ C. the Preferences folder

    ___ D. the Apple Menu Items folder

13. Identify the item that would most likely be stored in the Startup Items folder.

    ___ A. the Extensions folder

    ___ B. a TrueType font

    ___ C. an alias to a document created by a word processor

    ___ D. a sound file

14. Default settings for a word processor would most likely be found in the _____ .

    ___ A. the Extensions folder

    ___ B. the Startup Items folder

    ___ C. the Preferences folder

    ___ D. the Apple Menu Items folder

15. To install fonts or sounds you must drag them into the _____.

   ___A.   System file

   ___B.   Startup Items folder

   ___C.   Preferences folder

   ___D.   Apple Menu Items folder

16. You have an SE/30 with a 40 MB hard disk and 4 MB of RAM. You are having a memory problem opening a large file which was created in a drawing application. What might you do in order to open this file?

   ___A.   turn on virtual memory

   ___B.   turn off virtual memory

   ___C.   create an Alias to the file

   ___D.   Drag the memory icon into the Preferences folder

17. You have a Mac IIx with 3 NuBus cards installed. The maximum amount of virtual memory you can have is _____.

   ___A.   8 MB

   ___B.   11 MB

   ___C.   16 MB

   ___D.   17 MB

Compare Your Answers to Those Provided on the Next Page.

Module Test (Answers)

Check your answers against the ones provided below.

1. False. Not all System 6 programs are compatible.

2. False. You should always use the Installer program to install system software.

3. True

4. False. To access the Control Panels, choose Control Panels from the menu.

5. B - You should always backup your hard disk before installing System 7.

6. D

7. B

8. C

9. A

10. C

11. D

12. A

13. C - A document of some sort (or it's alias) is what you would typically place in the Startup Items folder.

14. C

15. A - You can drag them into the System Folder or directly onto the System File icon.

16. A - Virtual memory would allow you to utilize hard disk space as RAM, thus enableing you to open larger documents.

17. B - 11 MB - A Mac IIx utilizes 24-bit addressing with a maximum of 16 MB of addressable memory, minus 2 Mb for I/O & ROM, minus 3 MB for the 3 NuBus cards.

Additional References

This section contains information only. There are no step-by-step instructions in this section. You will not be tested on this information in the lab portion of the Macintosh Service Course. This information is for reference only.

What Is File Sharing?

If your Macintosh is connected to a network, you can make folders on your hard disk available to other users on the network, or have access to your entire hard disk from another system on the network.

This enables the open flow of information, and can help eliminate having many versions of a file lying around on different systems.

You have complete control over what you want to share and with whom at all times. You may:

- Share files in a folder with one other person or a group of people

- Share several folders with everyone on your network

- Share one folder with a group of people and share a different folder with another group of people

- Not share anything at all

This new feature allows users to share files without the need of a file server.

You may configure any CD-ROM to be shared, as well as any hard disk or folder on a hard disk. Since floppy disks are mobile by nature, you may not configure a floppy disk to be shared. You may also not configure a server to be shared. One limitation to be aware of is that only ten items (disks or folders) can be shared at a time. Another limitation is that a maximum of ten users can log onto your file server at one time.

When you turn on file sharing, an extra 200K of RAM memory is used.

What Is Publish and Subscribe?

System 7 has a special feature that allows you to link documents so that changes to a defined area of an original document are automatically made in defined areas of the linked documents.

A publisher is a specially selected portion of a document, changes to which are to be sent to other documents. The publisher creates an edition file, a special file linked to the publisher. When changes are made to a publisher, the changes are copied into the edition file. Each edition file has one, and only one, publisher.

A subscriber is a portion of a document where published changes are received. After changes are made to an edition file, these changes are copied into the subscriber. Any number of subscribers can link to a given edition file.

The names are chosen to remind you that a publisher's changes are delivered in editions that subscribers receive, not unlike a magazine. Published changes are available to all subscribers (if they choose to accept them).

Applications using this capability are easily recognized because they will have an additional section in their Edit menu displaying the available publisher and subscriber options.

Publishers and subscribers are very useful for documents that are shared by Macintosh computers on a network, such as those on file servers, because information from publishers can be broadcast to all subscribers on the network simultaneously.

A Note about Extensions

Most INITs that you may have used in System 6 are usually stored in the Extensions folder in System 7. In some cases, two different INITs/Extensions may cause a conflict when loading at startup. There are a few troubleshooting methods you can use to eliminate possible problems.

1. Startup without Extensions- To do this, hold down the Shift key when you turn on the Macintosh. You will see a note under the Welcome to Macintosh screen that says, "Extensions off". This is the most drastic method of troubleshooting since none of the extensions will be available to use until you restart.

2. Change the order of Extensions loading- Extensions load alphabetically, and sometimes two Extensions will compete for the same part of system memory. By changing the name of an Extension you can force it to load sooner or later in the Extension loading sequence. By placing an Option--space at the beginning of the name of an Extension, you can force it to load first. By placing "zz" at the beginning of the name of an Extension, you can force it to load last. The method is by "trial and error," but it can often resolve Extension conflicts.

3. Add Extensions to the system one at a time- If you have several Extensions and are experiencing crashes upon startup, it is often hard to tell which Extension is causing the problem. At startup, if you watch the icons of the Extension appear as they load, you can see which is the last Extension to load before the crash occurs. At this point you might try method 2 and force the Extension to load earlier in the sequence. But the "controlled test" environment can make the "trial and error" process a little easier. Start with a clean system folder using only Apple system extensions. Then add one Extension at a time, restarting your machine after each addition. When you find the culprit(s) check your compatibility listing to be sure it is compatible with System 7, if not then contact the 3rd-party developer of that Extension for an upgrade to a System 7 compatible version.